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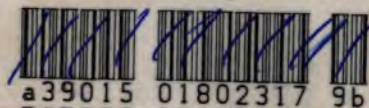
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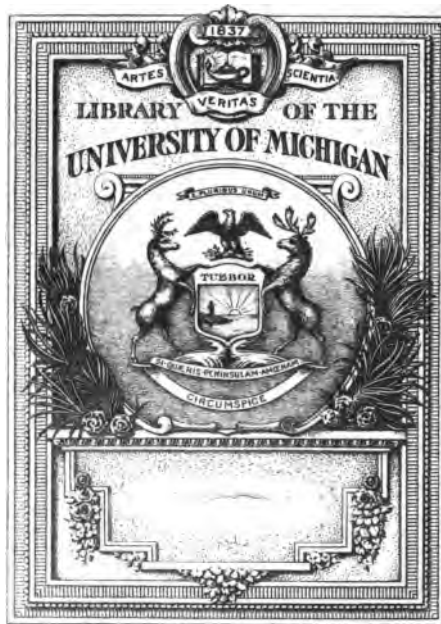
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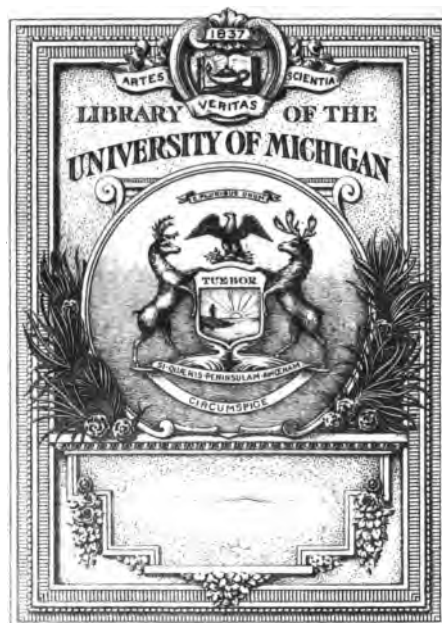
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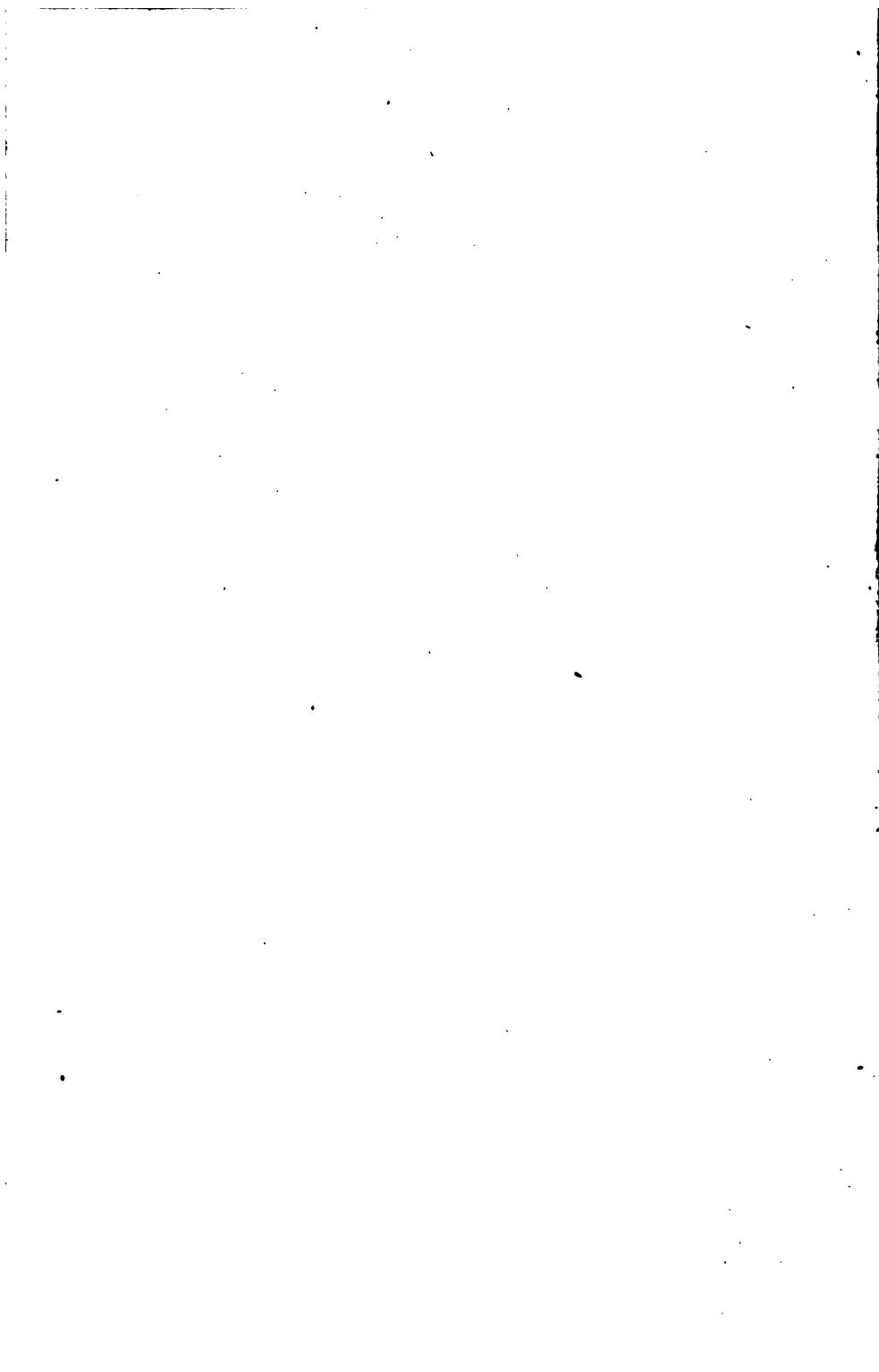
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BOTANICAL MISCELLANY.

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VOLUME THE SECOND.
(CONCLUDED).



LONDON:
JOHN VAN VOORST, PATERNOSTER ROW.
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"The question, *cui bono?* to what useful end are your pursuits? has often been asked of naturalists, but it has been already too often and too triumphantly answered by abler pens than mine, to render it necessary for me to apologize for indulging a love of Natural History, or to defend it from the aspersions of those who either fear or despise it. Happily the audience to which I should address myself is neither so numerous nor respectable as it was thirty years ago; it is becoming every day less so, and will soon be confined to the ignorant and the sensual. To those few well-informed persons who still, from old prejudices, accuse us

' ————— of dropping buckets into empty wells,
And growing old in drawing nothing up,'

we may say that till the well of creation be emptied there is no danger of our returning from our labours without abundant food for thought, and if we do not always make the best use of it, the blame must rest with us and not with Natural History."

—W. H. HARVEY.

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P R E F A C E.

DURING the present year the attention of naturalists has been publicly invited to the increased and increasing disposition on the part of the aristocracy to exclude men of science from their domains; thus the botanist is forbidden to wander over the naked hills of Scotland, and the habitats of our rarest plants are closed against his approach. In days when our nobles, glorying in their shame, thought it unworthy of their rank to be able to read or write, and kept a menial for the discharge of all such degrading duties; when they hanged witches and burned heretics, it would have been in keeping to close Glen Tilt and Braemar against the collector of herbs, least he should bewitch the heathen, or practise some occult art on the red grouse or deer: but now when even dukes can read and write, when the sciences of Botany and Geology are taught in our universities, when our aristocracy generally are as well educated as our tradesmen, this ostracism of science from their homesteads is an inexplicable return to the loathsome practices of that feudalism which marked the most degraded era of the human mind. The deed is rendered still more obnoxious from the frivolity of the plea: geologists and botanists are proclaimed poachers; are placed on a level with the midnight deer-stealer: the absurdity of the charge is only equalled by the ignorance which it discloses. I rejoice to see the matter taken in hand by our journalists, and trust it will not be abandoned until the universal cry of "shame" has penetrated the ears of the titled leaders in this crusade against science.

The year which is now drawing to a close has been one of considerable interest to the British botanist, and the 'Phytologist' has taken its accustomed lead in recording new discoveries and reviewing new

publications. It is by this means that it retains a position in the scientific literature of the day, truly gratifying to its proprietor, a position to which his own labours have contributed so little, that he feels he may, without any breach of decorum, boast of a success for which he is so completely indebted to the assistance of his friends. The utility of a journal which brings its information almost up to the day on which the subscriber receives it, cannot be called in question; and it is with great pleasure that I perceive on a reference to the dates of the papers published during the present year, that thirteen days is the average time between writing and publication: if this despatch be contrasted with the sluggish movements of publishing Societies or more technical periodicals, a reason for the preference given by our botanists to the 'Phytologist' is at once disclosed. A paper is despatched to the 'Phytologist' not merely in the belief, but in the knowledge, that it will appear in the number that next issues from the press.

A striking feature in the present volume is the importance and admirable character of the reviews, for most of which I am indebted to the kindness of contributors. I have always seen the advantage that must accrue from obtaining reviews from competent pens, and I have only trusted my own to criticise the labours of others when I have felt myself on safe ground. I wish in this place also to remark that the observations on System which occur in the notice of Steele's 'Hand-book of Field Botany' are from the pen of a kind contributor whose important services I have often had occasion to notice during the progress of this journal.

The botanical books of the year are :—

Cybele Britannica, by *H. C. Watson*, Phytol. ii. 782. This work is replete with information on the geographical distribution of British plants; it also contains valuable remarks on species and species-making.

Vegetable Physiology, by *Arthur Henfrey*, ii. 804. A very useful book to the student of structural Botany.

Manual of British Botany, by *Charles Cardale Babington*, second

edition, ii. 843-851. A work that the British botanist must possess : it is essential to a knowledge of the Botany of these Islands.

Hand-book of Field Botany, by *W. E. Steele*, ii. 987. This work omits a very great portion of the more useful parts of Hooker's *Flora* and Babington's *Manual*, and contains no useful additions to make amends: it appears ill-adapted for students, the arrangement of matter being obscure, and in many instances unintelligible.

Circulation of the Sap, by *G. Rainey*, ii. 1027. A little essay showing great patience and research, although I am not fully prepared to assert that the author's conclusions are satisfactory.

London Catalogue of British Plants, second edition, ii. 1051. Every botanist must possess it.

The original communications are still more replete with interest than the reviews, and I trust that the extracts from other sources will also be perused with satisfaction. Having undertaken the publication of a periodical like the '*Phytologist*,' it appears desirable to collect from all sources such information as may be acceptable to my readers. Although always reluctant to single out contributions for especial notice, I cannot refrain from inviting the most studious attention to Mr. Wilson's *Papers on Embryology*: these papers must occupy a higher place in the scientific literature of the year than any that have appeared during the same period: our country has reason to be proud of such researches, and the '*Phytologist*' is honoured in being selected as the vehicle for their publication.

The taste for writing on the potato-disease has subsided with the disease itself; the writers on this subject have not advanced a step towards discovering the cause or suggesting a remedy; the only result of their publications has been by keeping up the alarm to promote that speculation in potatoes, wheat and other articles of food, which during the present year has been carried to such an insane and reckless extent, that the commerce and credit of the nation has been almost completely suspended. It has however pleased an all-wise and beneficent Providence to send us such abundant crops of potatoes and

grain, that in the present prices of these staple articles of food we may hope to find a partial and gradual recompence for the past suffering, and a return of that spirit of active and energetic though prudent enterprise which has so long been the ornament of the British Empire.

The records of the present year which appear of most interest to British botanists are the following :—

Asparagus officinalis, Phytol. ii. 726. The Rev. C. A. Johns records several new stations for this extremely local plant, removing all probability of its being exterminated by botanists or guides.

Pyrrola maritima, ii. 727, is nothing more than *P. rotundifolia*; the Lancashire plant described by Mr. Kenyon is an old discovery, and noticed in the 'New Botanist's Guide,' vol. i., under the head 'Lancashire.'

Thorea ramosissima, ii. 806. Mr. William M'Ivor, of the Kew Gardens, has discovered this Alga in the bed of the river Thames, above Walton Bridge; it grows most abundantly, and is exposed to view at low water.

Thesium linophyllum, ii. 807. Mr. Mitten's paper on this plant is of great interest: he finds its roots parasitically attached to those of *Anthyllis vulneraria*, *Thymus Serpyllum*, *Lotus corniculatus*, *Daucus Carota*, *Scabiosa succisa*, *Carex glauca*, and some grasses.

Luzula nivea, ii. 814. At a meeting of the Botanical Society of Edinburgh, Dr. Balfour announced that this plant, discovered last year in a wood near Broomhall, had been planted there by a gardener, so that it can have no claim to rank as a British plant.

Lycopodium annotinum, ii. 824 and ii. 972. The Rev. Robert Rolleston has found this very local species in Langdale, and Mr. H. Ecroyd Smith on one of the precipitous sides of Bow-Fell, Cumberland. Both specimens are unquestionably correctly named.

Ranunculus ——— ? ii. 854. At the May meeting of the London Botanical Society, Mr. Watson exhibited specimens of an aquatic *Ranunculus* intermediate between *R. aquatilis* and *R. hederaceus*; it stands as 12d in the second edition of the 'London Catalogue.'

Trifolium strictum, ii. 908. This species, which as a British plant was formerly confined to a single locality in the Channel Islands, has been found in Cornwall, by the Rev. C. A. Johns, on a sloping piece of ground near a cove called Cairn William or Cathillian, between the Lizard Head and Kynance Cove.

Carex montana, ii. 910. This extremely rare British species has been found by Mr. Purchas, near Ross; the only other record of its occurrence in Britain is by Mr. Mitten (*Phytol.* ii. 289).

Simethis bicolor, ii. 926. Miss Charlotte Wilkins found this plant in a fir plantation, about two miles distant from Bourne, in July last: it is the *Simethis bicolor* of Kunth, the *Anthericum bicolor* of the 'Flora Atlantica,' and the *Bulbine planifolia* of Bertolini's 'Flora Italica.' I observe the authors of the 'London Catalogue' give it as a true native.

Allium sphaerocephalum, ii. 922. Mr. H. O. Stephens has discovered this species, previously known as a native of Jersey, on St. Vincent's rocks, near Bristol.

Malva verticillata, ii. 934. Mr. James Motley has discovered this addition to the British Flora in corn-fields, near Lanelly, in Glamorganshire, in company with *Malva crispa*, which he concludes had escaped from gardens. Mr. Motley (*Phytol.* ii. 993) corrects a previous error, copied in the 'Phytologist' from the 'London Journal of Botany,' that only a few specimens were found: it appears to have been in abundance.

Linaria supina, ii. 939. Mr. Keys states that this plant was found on ballast-heaps, at Catdown, Plymouth; it is therefore a very questionable native of Britain: Mr. Keys however considers it naturalized in this station: in the last Preface this plant is noticed as having been introduced with "foreign grain"—"with ballast" is the correct definition.

Hieracium heterophyllum, ii. 961. Mr. Bladon has ventured on the very bold task of describing a British species under this name: Mr. Bladon does not state in what part of the kingdom it is found: neither has he stated in what characters the new species differs from *H. umbellatum*, as Mr. Backhouse observes (*Phytol.* ii. 1022), but Mr. Watson, who has seen specimens from Mr. Bladon, informs me that he considers the two plants quite distinct.

Phalaris paradoxa, ii. 961, was found in July last, by Mr. James Hussey, in a field near Swanage, Dorsetshire, and by some error reported in the September number of the 'London Journal of Botany' as *Phalaris utriculata*, of Linneus, now *Alopecurus utriculatus*, a very different plant in generic characters, although curiously similar in general aspect.

Polygala depressa, ii. 966. Dr. Bromfield, who introduces this plant to the readers of the 'Phytologist' as found by himself on Bleakdown, in the Isle of Wight, has ascertained it to be Wenderoth's species, and also to be identical with the *P. serpyllacea* of Weihe; but he is disposed to regard it as a mere variety of *Polygala depressa*, although a variety not previously noticed as British.

Asplenium germanicum, ii. 974. Mr. H. Wilson has found this exceedingly rare fern near Lanrwst, in North Wales.

Udora canadensis? ii. 1050. This plant, which has received a multiplicity of names, and of which the nomenclature is still unsettled, was discovered in July last, by Miss M. Kirby, growing in great abundance in three reservoirs, by the canal in the neighbourhood of Market Harborough, in Leicestershire: when first observed, flower-buds were beginning to appear, and throughout August flowers were produced abundantly, but unfortunately those gathered proved all to be females, the plant being dicæcious. The stems are entirely submersed, a foot or more in length, growing horizontally and branched; the leaves are three or rarely four in a whorl, obscurely egg-shaped, embracing the stem, entire; the flower-

stalk is axillary with a small scale at the base, from four to six inches in length, enabling it to reach the surface, where, in the American species, it is impregnated by the male flowers, which are also axillary but sessile, and, becoming detached, rise to the surface, and there floating, come into contact with the female flowers, as in *Valisneria*, &c.: calyx in three segments, about half the size of the corolla, green; petals three, small, translucent, white; styles three, stigmas fringed, purple. There appears to be every reason for believing this plant a true native; its habitat is in a thinly peopled agricultural district, where it may have bloomed for many years unnoticed; from its abundance and the luxuriance of its growth I presume this to have been the case. Since the flowering season, the plant has gradually risen in the water, but although seed has been diligently sought for, none has yet been found. For most of these particulars I have to acknowledge myself indebted to the kindness of Miss Kirby, the discoverer. The subjoined additional particulars are from the pen of the Rev. Andrew Bloxam, of Twycross, Leicestershire:—" *Anacharis Alsinastrum*, Bab. In a small packet of plants which I received in September last from Miss Kirby, of Leicester, was a specimen totally unknown to me, and which, as I happened at the time to be writing to Mr. Babington, I sent to him for investigation. He considered it as a species of *Udora* (*Nuttall*), and resembling the *U. verticillata* (*Spreng.*) of the Fl. Boreali-Americana, of which there are specimens in Sir W. J. Hooker's herbarium—one from New Jersey, much resembling the British plant, except that its leaves are not so blunt. There are also in Sir J. Smith's herbarium, at the Linnean Society's rooms, American specimens from Muhlenberg of a 'Serpicula,' which seems to be exactly the Leicestershire plant. There are two species of *Udora* known in Europe—*U. occidentalis* (Pursh. sub *Serpicula secund.* Spreng. Syst. Veg. 1., p. 171), found in Pomerania, and *U. Lithuanica* (*Besser*), found in Lithuania. These

are described in Koch, Fl. Germ. 2nd ed., p. 771, who gives the generic character of the plant thus: '*Udora* (*Nuttall*) Flores dioici. Cal. tripart. Cor. tripetala, Mas. stam. 3. Fem. styli tres, bifidi, stigmata elongata, plumosa (Flores masculas nondum vidi).' I may here state that it has been thought better to apply Richard's earlier name of *Anacharis* to the plant instead of *Udora*. An allied species similar to that found in Leicestershire has been sent by Mr. Mackay to Kew Gardens, having been found in the neighbourhood of Dublin. A similar plant has also been gathered by Mr. Collins, of Chichester, from near Havant, pointed out to him by a gardener, who has observed it, as Mr. Borrer heard, for several years. Mr. Babington, however, states in a letter to me, that it is in the opinion of a gardener close by, a recent arrival: which of the two is correct? Mr. Borrer has also gathered it, as I hear, in Leigh Park, Hants: this probably is the same locality as that near Havant. It was discovered in Leicestershire, by Miss Kirby, of Lubbenham Lodge, in the past summer, in some reservoirs adjoining Foxton-locks on the canal near Market Harborough. She was kind enough to accompany me to the place in October last, and I found the plant in considerable abundance, particularly in the second and third reservoirs, growing closely matted together, and the upper portion floating on the water. She had not observed it in previous years, and the reservoirs had been cleaned out two years ago. The canal had been made about thirty years, and the reservoirs (about a quarter of an acre in size) were then formed for collecting the waste water from the upper locks and conveying them to the lower ones. The only conclusion I can come to in reference to its discovery in Leicestershire and elsewhere is, that the seeds have long lain dormant in the localities where it has been found, and that some peculiarity of the two past seasons has caused them to vegetate. I find in a pond in my own neighbourhood that the *Myriophyllum alternifolium* disappears altogether some seasons, and

at other times comes up in abundance and entirely covers the pond. I have seen but few specimens of the plant in flower; of the two which were given to me by Miss Kirby, of Leicester (who is a relative of Miss Kirby, of Lubbenham Lodge), I sent one to the London Botanical Society, the other to Mr. Babington: both were female plants, with the stigmas beautifully plumose or fringed. Several of the specimens which I collected had the peduncles of the flowers still remaining, which were shortened or elongated (not in a spiral manner like the *Valisneria*), according to the distance of that portion of the stem, from whence they sprang, to the surface of the water, but the whole of the germen was gone, and the bifid sheaths seen in the flowering specimens were obliterated. It is to be hoped that male flowers may be discovered next year, and then it will doubtless be decided whether the plant is altogether a new species, or identical with some of the American forms." In conclusion, I may state that Reichenbach makes two German species of the genus, and that Mr. Watson informs me Dr. Planchon thinks he has detected three American species. The British plant will be likely to prove identical with one of the German species. I have committed an error at page 1050 in supposing the genus not European.

Rubus fruticosus, &c., ii. 1049. *Rubus* still continues to be the most fashionable genus of British plants: two accomplished botanists, the Rev. Andrew Bloxam and the Rev. W. A. Leighton, have issued fasciculi of specimens in illustration of the variations to which these polymorphous plants are liable. My proposition of raising Rubi from seed, although at first treated as irrelevant and chimerical, has obtained the serious consideration of a botanist whose labours in the cause of the bramble are already well known, and the result of whose present experiment will appear in a future number of this journal.

It seems desirable in this place to notice some inaccuracies which occurred in the Preface last year and which require correction.

Carduus setosus, ii. 31, and *Cirsium setosum*, ii. 441, are of course synonymous: this double record occurred through the list of novelties being the work of two pens, the first of which gave one name and reference, the second another: the error was not discovered until too late to amend it: all botanists consider the plant a variety of *C. arvensis*.

Cnicus oleraceus, ii. 53. The record of this plant having been found by Dr. Bromfield in the Isle of Wight is erroneous: the species is not admitted by our botanists as British.

To myself it is always a source of peculiar satisfaction to receive those simple and unassuming records of which the authors themselves often doubt the value, and which would assuredly be rejected from more pretending journals: that *Trifolium strictum* grows at the Land's End, *Allium sphærocephalum* at Bristol, *Lycopodium annotinum* in Cumberland, and therefore all three in England, are facts of little importance to mankind generally, but to the British botanist, and for him especially this unpretending journal was established, they are of greater interest than a hundred Latin descriptions of antipodal species, which, should he live far beyond the age wisely allotted us, he will never see, and never again hear of or read of. I earnestly solicit my readers never to omit recording facts like those I have cited, in the fear that they may be deemed unwelcome or unimportant: I earnestly beg of them to transmit the earliest possible notice of such facts, and in cases of doubt rather to accompany the communication with a specimen for confirmation, than cause delay by endeavouring to understand an indifferent description or unravel a confused synonymy: such specimens shall always be returned if required, the motive in making the request being to save the writer and the 'Phytologist' from the imputation of error.

Once more I beg to offer my warmest thanks to contributors and subscribers, especially to those who have by their kind advocacy in-

duced others to subscribe; and I may add that the paging begins anew with the January number, in order to relieve those subscribers who commence with 1848 from the necessity of purchasing the back numbers, unless they desire to possess them.

I cannot with propriety lay down my pen without adverting to the omission of an "Index of Subjects." The difficulty of compiling such an index I have found much greater than I anticipated: an index to be of any value should contain a reference to every plant mentioned in the text, yet if rendered thus voluminous it would in a great measure nullify itself; for instance, a name occurred fifty-six times in the year 1846, it would therefore require fifty-six references to the text, a most bewildering number. I tried to obviate this objection by selecting those names of plants which appeared of more than usual interest, but soon found myself lost in the enquiry whether the plant were worth indexing or not. At the close of 1845 I attempted what might be termed an "Index of Articles," but I found this perfectly useless to myself, when desiring to compile a list of additions to our Flora; because these, often occurring in the Reports of Societies, escaped all notice in an "Index of Articles." Hence it has seemed to me that a complete index would be *almost* useless and an incomplete index *quite* so, and I have therefore concluded on the present occasion to confine myself to an "Index of Contributors," giving at length the title of every contribution under the name of its author: also a list of the books reviewed and a reference to the reports of Societies. I trust that this arrangement will prove satisfactory, at least for the present: and I may state that I shall feel extremely indebted to any subscriber who will suggest anything better for the future. I will cheerfully and thankfully adopt any suggestion that may tend to facilitate a reference to the enormous mass of facts which the pages of the 'Phytologist' have rescued from oblivion.

EDWARD NEWMAN.

Devonshire Street, Bishopsgate,
December, 1847.

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THE PHYTOLOGIST will be continued both as a monthly and an annual publication. As a monthly, it will contain thirty-two pages of letter-press, occasionally accompanied with illustrations engraved on wood; it will be on sale three days before the end of every month; and will be charged one shilling. As an annual, it will be sold on or about the 1st of December; will contain twelve monthly numbers, bound and lettered uniformly with the present volume; and will be charged thirteen shillings.

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THE PHYTOLOGIST.

A few Notes on Cornish Plants.

By the Rev. C. A. JOHNS, M.A., F.L.S.

MR. GIBSON, in his notices of Cornish plants, lately inserted in the 'Phytologist' (Phytol. ii. 676), states his fear that *Asparagus officinalis* may soon become extinct on the island which takes its name from that plant. Botanists who are anxious that the stations of our rarer plants should be preserved, will be glad to hear that there is no real danger in the case of this interesting plant. I call it interesting, not only from its being a botanical rarity, but because *it is said* to be the origin of the variety of that delicious vegetable, the green Battersea, and *I know* that it has been cultivated with great success. Little harm is done to the plant by the guides, as they never take up the roots, and possibly the annual destruction of the foliage, though it prevents the plant from flowering, may promote the extension of its roots. But even if this station be destroyed, there are at least two others, one of which is about a mile to the west of Kynance Cove, among the rocks on the cliff, where it flowers abundantly; another is near the village of Cadgwith, about two miles east of the Lizard. In this last station it grows in great profusion, in a deep ravine, and produces flowers and fruit. A gentleman who was some years since stationed there as Lieutenant in the Preventive Service, told me that he annually supplied his table from this station during the season, and found it very good.

My friend, Mr. Hore's *Geranium sylvaticum* was undoubtedly a slip of the pen for *G. sanguineum*. *Alsine verna* and *Spergula nodosa* grow side by side at Kynance: the latter plant may best be distinguished at a distance by its less tufted growth, brighter foliage, and larger flowers. *Cladium mariscus* and *Genista pilosa* might have been added to the rarities flowering in August. *Orobanche rubra* was remarkably abundant this year, especially on the sand-hills at Kennuck Cove; it withers in July. *Thalictrum flavum* formerly grew at this place, but I looked for it last June in vain. In a romantic, rocky glen, between Kennuck and the Lizard Cove, *Ruscus acu-*

leatus grows in great abundance, conspicuous in early spring for its bright crimson berries as large as cherries.

On the banks of the Looe Pool, in addition to the plants mentioned by Mr. Gibson, grow *Pyrus torminalis*, in a thicket near the sea, *Littorella lacustris* in several places, and *Jungermannia pumila* on the rocks under Degibna wood. In this last spot *Erica vagans* seems quite at home: in the woods on the opposite side it has been planted.

Briza minor is common in the neighbourhood of Kelston, growing among wheat and barley, which it frequently outtops. It is remarkable for shifting its place of growth, being found in abundance one season, and then entirely disappearing for many years. *Silene Anglica* is a common corn-weed; *Linaria spuria* not rare. *Elatine hexandra*, when I first discovered it, now many years since, grew on the banks of the Looe Pool in several places; where the soil was muddy and soft it attained its full size, but where the soil was gravelly and drier it assumed a deep red tint, and grew in tufts less than a quarter of an inch high.

It will always give me pleasure to direct any readers of the 'Phytologist' to the exact localities of these plants, if they are ever tempted to botanize over this remote district, reserving to myself the right of withholding information about those which are found only in small quantities from all travellers who collect for either of the "Societies for the Extermination of rare British Plants."

C. A. JOHNS.

Grammar School, Kelston,
November 23rd, 1846.

BOTANICAL SOCIETY OF EDINBURGH.

Nov. 12th, 1846.—Dr. Balfour, President, in the chair.

The following communications were read:—

1. On the species of *Glyceria* by Mr. Fred. Townsend, of Ilmington, Warwickshire. In this paper the author gave full descriptions of *Glyceria fluitans*, Br., *G. plicata*, Fries, and of a supposed new species found in Cambridgeshire and Warwickshire, which he proposes to name *G. hybrida*, and pointed out the distinctions by which they may be known from each other.

2. Dr. Balfour read a description of *Exogonium Purga*, Benth., the true Jalap plant, and noticed some points connected with its medical history. The jalap plant was for a long time referred to *Convolvulus*

Jalapa of Linnæus and Willdenow, or *Ipomœa macrorhiza* of Michaux, a native of Vera Cruz. It has recently been proved, however, from various sources, to be the plant now under notice, which grows in the hill country near Jalapa, in Mexico, at a height of about 6000 feet above the level of the sea. The plant was first sent to the Edinburgh Botanic Garden by Dr. Christison, who received it from Dr. Coxe, of Philadelphia, and has flowered several times in a cold frame. It belongs to the natural order Convolvulacæ. The genus *Exogonium* has been separated from *Ipomœa* by Choisy, on account of its exerted stamens. Specimens of the recent plant were exhibited. Dr. B. also described *Stenocarpus Cunninghami* of Hooker, and exhibited a fresh specimen in flower. This plant has been long known in gardens under the name of *Agnostus sinuatus*. It is a small evergreen tree, belonging to the natural order Proteacæ, sub-order Folliculares, and tribe Grevilleæ. It was found by Allan Cunningham on the banks of the Brisbane River, Moreton Bay, and is remarkable for its umbellate inflorescence, and showy orange-scarlet flowers, with reflexed and sub-secund segments of the perianth. The plant was first introduced into the Royal Gardens at Kew, whence it has been distributed over the kingdom. It has flowered this season for the first time in Britain.

2. Remarks on a *Pyrola* found in Lancashire, by Mr. Kenyon. Specimens of this plant, which is considered by its discoverer as a new species, and which he proposes to call *P. maritima*. in allusion to the localities in which it is generally found, were shown to the meeting. It is nearly allied to *P. rotundifolia*, from which it may be distinguished by its size, the form and length of its sepals, and length of the stamens. Some excellent botanists who have examined it, are of opinion that it is only a variety of that species.

Mr. Wm. M'Ivor, of the Kew Gardens, sent specimens of an *Orobanche*, considered by him to be *O. lucorum*, Braun, gathered on Epsom Downs; also *Hormospora mutabilis*, from Studley, Yorkshire, and *Thorea ramossissima*, from the Thames, near Walton.

A series of beautiful photographic delineations of various forms of leaves, prepared by Mr. James Lumsdaine, jun., of Lathallan, Fife, was exhibited, and an account read of the process by which they were obtained.

There was also exhibited a collection of *Rubi* from the Rev. A. Bloxam, of Twycross, Leicestershire, containing some new species and varieties.

Framed Portraits of the late professor Graham, Sir Wm. Hooker,

Robert Brown, Esq., and Dr. Neill, were presented to the Society from Mrs. Graham.

Mr. James Davies presented excellent dried specimens of 20 species of Agarics, collected by himself in the neighbourhood of Edinburgh.

The following donations to the Library and Museum were announced as having been received since last meeting, viz.: Delessert's *Icones Selectæ*, vol. 5, from the author; *Über die Tanacetum*, by Carl H. Schultz, from the author; Tenth Annual Report of the Warwickshire Nat. Hist. Society, from W. G. Perry, Esq.: a collection of North American plants from Dr. Gavin Watson, of Philadelphia; European plants from Dr. Molkenboer, of Leyden, Ph. Wirtgen, of Coblenz, and M. J. Zohr, of Trier; also of British plants from various contributors. The thanks of the Society were voted to the respective donors.—*W. W. E.*

Notice of 'The Potato Plant, its Uses and Properties: together with the Cause of the present Malady. The extension of that disease to other Plants, the question of Famine arising therefrom, and the best means of averting that Calamity.' By ALFRED SMEE, F.R.S., Surgeon to the Bank of England. Longman: London, 1846.

WE have rarely read a book with such unmingled satisfaction as that published under the title which we have given above. We cannot check the smile that returns to our physiognomy as often as we peruse any of its profound aphorisms. Those of our contemporaries who have noticed this brochure, appear to have entirely misunderstood its object, which we take to be that of burlesquing the solemn, vapid nonsense with which the press has lately teemed on the subject of the potato. The entire work is written with the most inimitable skill, even when you have discovered the author's gist, you cannot avoid being led away by the solemn vraisemblance of his style. The 'Surgeon to the Bank of England' thus announces, with infinite naïveté, his qualification for the self-imposed task. "It frequently happens that I have to traverse London in two or even more directions in a single day, which circumstance has given me abundant opportunities of making my observations in different localities."—p. 11. There is an exquisite keenness in this, under which not only the Commissioner but the Essayist must writhe in agony;

for they have penned assertions quite as ludicrous as saying that a daily journey from Norton Folgate to the Mint, and from St. Giles to Rosemary Lane, qualifies a man to write on the potato-disease. The microscope and its parts, at page 13, would do honour to 'Punch.' A, the foot, B, the pillar, C, the brass arm, &c., &c.; we venerate that microscope; we possessed just such an one before our beloved parents clothed us in that peculiar, bifurcate garb which in this country distinguishes the sexes. The figure of the potato plant at page 17, is equally delicious, and so is the following excellent aphorism:—

"In consequence of the set being usually below the ground, and the shoots having a tendency to grow towards the light, part must be below the earth's surface whilst the other part extends upwards and expands its foliage to the atmosphere."—p. 18.

Commissioners should have the following reprinted in gold:—

"Potatoes can be cooked either by boiling, steaming, baking or frying, the only point requiring attention being the application of the heat, which should be managed in such a manner that all part may be cooked equally, and not one part overdone before the other is warm."—p. 39.

The fumbling and cross-reasoning of the various writers is admirably hit off by our witty author, a curious example of which we shall give below. It is, however, due to Mr. Smee previously to state that he charges the potato-disease to the account of a small insect, the *Aphis rapæ* of entomologists, to whom he very properly apologizes for giving it a new name, "THE VASTATOR."

"The vastator begins at the larger leaves of the potato plant, which, after a short time, becoming injured by the abstraction of the sap, die either partially or entirely. In this case the insect follows up the leaves till only a few on the top of the plant are left.

"This operation is not going on in one plant alone; it is generally progressing in every plant in the field at the same time, leaf by leaf all dying, &c.—p. 87.

We are then instructed how the abstraction of the sap causes the disease: and after the subject has been treated with the most elaborate prolixity we are refreshed by the assurance that the vastator cannot live "upon a very vigorous plant, because it would be drowned by the water transpired at night."—p. 133. This bit of nonsense is really matched by much that has been previously published, and is no caricature. We are then told that the vastator commences upon leaves which have lost their vigour. "On placing insects upon

the new leaves of very vigorous plants, I have observed that the creature has always been obliged to leave them."—p. 134.

In one place the vastator "lives upon the juices of the plant," then, again, "the solid portion is taken away by the insect."

At pages 19 and 20 we have the physiology of the potato treated in the true essay-writer style, and at pages 132 and 133 we have another version of the same subject, but both are so quaint, so dry, so inimitably serious, that the drift of the writer is concealed in the delicious ambiguity of his paragraphs, and we honestly confess ourselves to have been his dupes whilst we were reading the earlier chapters and verses.

Several species of *Aphis* or plant louse do *really* infest the potato, but none of them in any abundance, or to an excess that can possibly do the plant an injury: and it is a subject worthy the attention of cultivators that those plants in which the plague-spots of the disease make their appearance, are remarkably free from *Aphides* or other insects, a circumstance which would go far to show that the disease which is so injurious to the plant is equally inimical to its natural parasites. There is an inscrutable intimacy between plants and their insect parasites that is well worthy the attention of the instructed naturalist: it opens up a wild field for observation, and one which we cordially recommend to our readers: we need scarcely assure them that the *Aphis rapæ* has nothing whatever to do with the disease in question. Indeed, it is by proposing so very ridiculous an explanation of the evil, as it were out-Heroding Herod, that the author throws his withering sarcasm over the lucubrations of the essayists.

We wish that every idle fashion could find a Smee to bring it into ridicule: we are convinced that the shafts of satire penetrate much farther than those of argument, and we trust that an end will now be put to the frivolous pamphleteering about the poor potato. If this happy consummation be achieved by the keen pen that has laid waste the mass of rubbish written on the subject, we shall be glad to transfer the name of "vastator" from the innocent *Aphis* to its talented biographer.

We may, however, remark that Mr. Smee has selected a rather expensive way of accomplishing his object: on future occasions we should recommend his publishing through the medium of our respected contemporary, 'Punch,' whose columns are ever open to well-intended satire.

K.

Notice of 'Travels in Lycia, Milyas, and the Cibyratis, in company with the late Rev. E. T. Daniell.' By Lieutenant T. A. B. SPRATT, R.N., F.G.S., of the Mediterranean Hydrographical Survey; and Professor EDWARD FORBES, F.R.S., of King's College, London, and the Geographical Survey; late Naturalist to H.M. Surveying Ship Beacon. 2 vols. Van Voorst: London, 1847.

THIS work is one which has been looked for with considerable interest: Mr. Van Voorst has contrived to keep the *promise* of its appearance so skilfully before the public, that we have never been able to lose sight of it, and it is with pleasure we find that the promise is now fulfilled. We began to imagine the work congeneric with Mrs. Harris and Professor Forbes' '*Rambles of a Naturalist*,' inviting shadows cast before by events that were to come, a character which they seem destined ever to maintain. In this faith, however, we have met with a most agreeable disappointment. The '*Travels in Lycia*' are now before us, in two goodly tomes, illustrated by some of the best plans, and some of the worst views we have lately seen. The plans are admirably drawn and engraved: the views may have been well drawn, but are so wretchedly executed in lithotint, that we could wish them anywhere but in the work which they disfigure.

The narrative is written in an easy, readable style, and is replete with valuable and interesting information. We almost regret that the restricted scope of the '*Phytologist*' precludes our quoting any portion of the first volume, which is by far the more agreeable of the two. The second treats almost exclusively of the Natural History of the journey: in the phytological portion we find much that is pleasant, and quite worth transferring to our pages.

The Beacon arrived at Termessus in the first week in January, when but few plants were in flower, but three months previously Messrs. Hoskyn and Forbes had landed at Kalamaki, near Patara, and found the hills and little sheltered bays around that port, thickly covered with woods of the strawberry-tree (*Arbutus Unedo*), then forming its fruit, while oaks, carobs, wild olives, figs, &c., united in constituting the arborescent vegetation of the coast. Around the trees were thickets of storax, Daphnes and myrtles of enormous size. This gives one a very agreeable idea of the face of the country, and the more so that the writer has confined himself to a modest statement of the facts, unaccompanied by any rhapsodical panegyrics.

On crossing the hills to the plain of Xanthus the wild pomegranate was observed abundantly and in fruit.

The rarest and most interesting plants met with in February were *Saxifraga hederacea*, which grows on moist rocks and among tombs, and *Tulipa Sibthorpiana*, the small, yellow blossoms of which are drooping, and not larger than those of our snowdrop. The writer also observed that the leaves of specimens gathered at Moiri, where it grows among the thickets near the theatre, were much narrower than those represented in the 'Flora Græca.' In March a large number of the spring flowers had opened, and among them *Asphodelus ramosus* was very conspicuous. Some common British plants were noticed, as *Sonchus oleraceus*, *Saxifraga tridactylites*, *Stellaria nemorum* and *Cerastium vulgatum*; and our beautiful *Ranunculus aquatilis* was in full bloom in the ponds among the marshes. At Antiphillus the sea-side vegetation was in great luxuriance and full bloom: large bushes of *Euphorbia dendroides* covered the warm, rocky slopes of the hills, mingled with *Styrax* and *Phillyrea latifolia*, and several shrubby *Labiatae* of the genera *Teucrium*, *Phlomis*, *Salvia* and *Lavandula* scented the air with their fragrance. The beautiful flowers of *Ophrys speculum* seemed as if each was a little mirror of ultramarine glass, framed in a fringe of crimson velvet. *Orchis longicornis* grew in great abundance on the hills near Cassabar, and it is chiefly from the roots of this species that salep is made. The high plain on which the cities called *Cyanæ* formerly stood produced such abundance of *Veronica grandiflora* as to render the fields completely blue, and induced the writer to query whether this circumstance had not given rise to the name.

We must, however, pass over many interesting pages in order to quote at length the passage which contains a summary of Lycian vegetation, which we feel sure will be read with interest by all our subscribers.

"The surface of the country consists of plains and deep valleys, bounding or leading from the sea, and of high mountains, with steep forest-clad sea-ward slopes, walling in alpine plains, mostly bare and treeless, except around the villages. These topographical features indicate as many botanical regions. The first includes the great maritime plains and valleys—the vegetation from the edge of the sea to an elevation of about fifteen hundred feet. The second includes the mountain-slopes towards the sea, from an elevation of fifteen hundred to nearly three thousand feet, and the yailahs or highland valleys which open out seawards. The third is the great inland region of sub-

alpine plains—the true yailahs, the inhabited parts of the table-land of Asia Minor, elevated from three, to five thousand five hundred, feet above the sea, and in some places presenting an uniform vegetation to a greater height. A fourth botanical region of elevation is presented by the mountain peaks and ranges, elevated from six to ten thousand feet above the level of the sea, which rise out of the table-lands and wall them in. We shall now attempt to sketch the principal botanical features of these several regions.

“I. REGION of the maritime plains and valleys. The vegetation of this region is that characteristic of all the mediterranean shores. The majority of plants which flower on the Lycian shores and maritime plains, may be met with from Spain to Asia. Oaks, oriental *planes*, and peculiar pines constitute its forests; *Leguminosæ*, *Labiata*, *Crucifera*, *Caryophyllaceæ*, *Liliaceæ*, and *Irideæ*, make up its herbaceous vegetation. In Lycia, the low hills of this region are covered with myrtle, *Arbutus*, *Daphne*, *Phlomis*, *Styrax*, *Cistus* and *Lentisk*; the *Elæagnus*, the Oleander, the Chaste-tree, and *Colutea*, are the shrubs which are most conspicuous on the borders of the plains; the fences are constructed of Christ-thorn (*Paliurus echinatus*); in the neighbourhood of the sandy shores grow *Passerina* and *Ruscus*: the waste ground is studded with bushes of Juniper (*Juniperus Phœnicea*), spiny burnet (*Poterium spinosum*), spiny cichory (*Cichorium spinosum*), and *Lithospermum hispidulum*; on the rocks by the sea-side, great bushes of tree spurge (*Euphorbia dendroides*) are mingled with more humble but more gaily flowering shrubby knots of variously coloured knapweeds (*Centaurea*), and everlastings (*Helichrysum*). These extend up the hill-sides, and mingle with shrubby *Labiata*. In waste places the *Ricinus* grows, and the gorgeous dragon Arum. Along the marshes the great reed (*Arundo Donax*), flourishes in miniature forests, and is often used to fence the fields on the alluvial plains. The damper parts are covered in autumn by the tall golden-flowered *Astericus aquaticus*.

“The wild olive covers the hills, wherever the Pine (*Pinus maritimus* and *halepensis*) and the *Arbutus* leave room. The balanea oaks (*Quercus ballota*, *aegilops*, and *infectoria*), afford ample shade. The mastic, the fig, and the mulberry are not unfrequent, both cultivated and wild. The oriental planes afford abundant shade near every village, and the dark and towering cypress is planted by the place of burial, but grows wild in the ravines. The pomegranate flourishes in great abundance, and its wild fruit supplies a grateful refreshment under the warm sun of autumn. The almond and manna-ash grow wild

among the rocks, and the bay and Judas-tree in the ravines. The orange and the lemon are cultivated. Melons, cucumbers, sesame, maize, cotton, capsicum, lentils, kidney-beans and balmias (*Hibiscus esculentus*) are the common cultivated vegetables.

"The wild herbs of the low country are many and varied. The sandy sea-shore abounds in species of *Medicago*, among which the hoary foliage and yellow flowers of *Medicago littoralis*, and the *Lotus creticus*, are conspicuous. Also the horned poppy (*Glaucium luteum*), the *Hypecoum*, and the purple flowers of *Malcomia*. The weeds of cultivated lands and waste grounds are those of the south of Europe, and among them the spurting cucumber (*Momordica elaterium*), the *Acanthus*, and the *Tribulus*, especially attract our attention. The green sward at one season is gay with anemonies, at another with many species of ranunculus. Numerous curious kinds of *Orchis* and *Ophrys*, musk-hyacinths, asphodels and star of Bethlehem adorn the plains, and everywhere are prickly but gaily flowering herbs of the genera *Echium*, *Lycopsis*, *Lithospermum*, and *Anchusa* among the Borage tribe, and *Echinops*, and *Carthamus* among the thistles.

"Plants curious rather for aspect than for beauty, as *Lapsana stellata*, *Hedynois rhagadioloides*, *Salvia horminum*, *Ziziphora capitata*, *Hymenocarpus circinatus*, *Trigonella*, *Biserrula*, *Andrachne*, and *Aristolochia*, arrest the attention of the botanist at every turn.

"By the sea-shore, in many places, kinds of *Statice* abound. The most beautiful is the *Statice sinuatum*, which covers the interstices of bare and waste rocks, with its handsome lilac flowers and wavy foliage, the more pleasant to look upon, since in early summer, except some bushy and ugly though strongly scented *Labiatae*, there is little else of verdure to attract the eye in such places.

"II. REGION of mountain-slopes and sea-ward uplands. This is the chief realm of the oak and pine-forests, for which Karamania is famous. It is botanically a region of transition, wherein the flora of the sun-burnt lowlands is mingled with more temperate forms, and with the characteristic plants of the table land of Asia Minor. It abounds in species of broom, and other shrubby *Leguminosae*, among which, *Anagyris foetida* is especially conspicuous, and sure to attract the attention of the traveller when loaded with its singular inflated pods. The dwarf holly-oak (*Quercus coccifera*) is abundant everywhere. The Salep orchis abounds. The walnut is the most plentiful and conspicuous tree around the villages. Vineyards and tobacco fields yield rich produce in this zone. Many common British herbs attract attention here—the primrose, the pimpernel, the dog-violet, the pansy,

and the self-heal. Every where the *Lantum maculatum*, is plentiful. Such ferns as do occur, are chiefly found here. Maples are frequent, as are also willows, chaste-trees, the *Rhus cotinus*, and the tamarisk. The carob is common here as well as in the lowlands.

"III. REGION of the yailahs or mountain table-lands. The yailahs of Almalee, three thousand six hundred feet above the sea, of Seydeleer four thousand, of Cibyra three thousand five hundred, and of Stenez three thousand three hundred, furnished us with our chief collections from this region. They are very even and apparently flat, though really sloping plains, each watered by a stream, and either continually or for a portion of the year presenting a lake at the lower extremity. They have no outlets. The centre of the plain is bare and treeless, except near the villages, which are surrounded by walnut trees, Lombardy poplars, apples, apricots and pollard willows. Planes are comparatively scarce. In some of the warmer and less elevated yailahs, large oaks and elms are met with, but the forest belt which margins them is commonly of pines. Thickets of *Quercus coccifera*, Berberry and yellow jasmine, cover the waste and rocky grounds near their edges. The vine is grown on the plains of Almalee and Saideleer, and good grapes for eating are produced. Much corn is cultivated on the yailahs. In cultivated grounds the common weeds are *Alliaria officinalis*, *Asperugo procumbens*, *Sisymbrium Sophia*, *Malope malacoides*, *Erysimum officinale*, *Hypecoum*, *Lamium moschatum*, *Scandix australis*, *Contaurea cyanus*, *Fumaria parviflora*, and species of *Bupleurum*. The more characteristic herbs are *Geranium tuberosum*, *Androsace maxima*, *Scutellaria orientalis*, *Euphorbia rigida*, *Lithospermum orientale*, a yellow *Galium* and species of *Cerithe*, *Onosma*, *Arethusa*, *Cynoglossum*, *Myosotis* and *Echinospermum*. Many curious forms of *Compositæ* and *Cruciferae*, also occur. *Cruciferae*, *Boragineæ*, *Compositæ* and *Caryophylleæ*, out-number all other orders in the yailahs.

"REGION IV. Above the yailahs, and bounding them, is the region of mountain peaks. These reach to various heights from six to ten thousand feet, and are bare and treeless towards their summits. The snow rests in crevices throughout the year, and during winter and spring, forms extensive and conspicuous masses. Below the snow, the pale yellow and bare limestone is speckled here and there by the gloomy foliage of the *Juniperus excelsa*, a clumpy and cedar-like tree, which becomes more abundant as we descend, until at between six and eight thousand feet, it forms a dark zone round the mountain and again diminishes to give place to pines. It is the tree called 'cedar' by

travellers in Asia Minor. Near the snow and above the junipers, alpine fritillaries and violets, *Fumaria rutæfolia*, *Scilla bifolia*, *Draba aizoides*, *Achillea umbellata*, *Crocus nivalis*, *Anemone Appennina*, and some species of *Gagea*, *Ornithogalum*, *Veronica*, *Alyssum* and *Draba* are the characteristic plants. Where the snow occupies crevices considerably lower down, these plants may be often found growing beside it. In the belt of cedar-juniper, and towards its upper part, grow species of *Gnaphalium*, *Campanula*, *Cerinthæ*, *Sideritis*, *Alchemilla*, *Scorzonera* and *Santolina*, with which, we do not meet lower down. Here are also *Prunus prostrata*, *Ernodea alpina*, *Digitalis ferruginea*, *Aubrietia deltoidea*, and peculiar species of *Aretia*, *Colchicum* and *Crocus*.

"Throughout our journeys we paid careful attention to the relations of the distribution of the indigenous plants to the soil in which they grew. The simple features of the geology of Lycia and the constancy of mineral character of the various rocks over considerable tracts of country enabled us to do this with facility and precision. Whilst each of the several regions into which we have attempted to divide the vegetation of Lycia considered as to its vertical distribution, presented a general character of its own, that character, was locally varied, according as the foundation rock was the hard appennine limestone, the sandy rocks which cap it, the soft tertiary marls and conglomerates, or the brittle and barren serpentine, the only igneous rock in this part of Asia Minor which occupies sufficient space to affect the flora.

"At almost any distance we could distinguish the serpentine from the limestone country, not merely from the peculiar bossy character and pink colour of the hills of the former, contrasting strongly with the abrupt and broken escarpments and gray and yellow rocks of the latter, but also from the disposition of the arborescent vegetation. On the serpentine usually pines only grew, and never in thick forest masses, but scattered, as it were individually, and as if they had been planted in a quincunx arrangement. Where the limestone was wooded, and in many parts it bore great forests, thick clustered oaks covered a luxuriant underwood, interrupted by groves of strawberry trees, and by clumps of lofty pines. High in the mountains the pines prevailed over the oaks, and higher still, the cedar-junipers replaced them. In the region of the upland slopes, much of the mountain sides consist of greenish sandstones, probably intermediate in age between the secondary and the distinctly tertiary rocks. These were usually covered with dense forests, consisting exclusively of pines, though on the neighbouring limestone, the oak was the prevailing tree.

"The contrast between the vegetation of the limestone and the serpentine, was maintained equally in the yailahs and among the higher mountains, and in the low country near the sea. In the latter we found the serpentine in spring always indicated by the presence of *Senecio squalidus*, a conspicuous little *Erophila*, and the fern *Cheilanthes odora*, which occupied the place taken by the *Acrostichum lanuginosum* on the limestone. Peculiar species of *Alyssum* also distinguished the herbage of the two rocks.

"In order to establish a comparison between the vegetation of the serpentine and the limestone in the mountain region, two points were selected, the one an isolated hill of serpentine, near Balbura, rising about six hundred feet out of a plain, four thousand seven hundred feet above the sea ; and the other, that portion of the peak of Cragus corresponding in elevation. Every plant in flower was gathered on each station, and such trees as were present noted. Both localities were equally bare and rocky, and the herbaceous vegetation on each consisted of little patches of plants growing in crevices of the rocks, and was remarkable for presenting scarcely any grasses among the species composing it.

"On the serpentine at the Balbura station, we gathered forty-eight species. They belonged to the following genera :—

Ranunculus, 1	Erodium, 1	Scorzonera, 1
Alyssum, 1 (peculiar)	Astragalus, 2	Hieracium, 1
Thlaspi, 1	Cytisus, 1	Senecio, 1
Arenaria, 1 (peculiar)	Sanguisorba, 1	Onosma, 1
Stellaria, 1	Undetermined umbellifer, 1	Myosotis, 2
Silene, 2	Cerastium, 2	Polygonum, 1
Crepis ? 1	Paronychia, 1	Euphorbia, 1 (peculiar)
Anthemis, 1	Thesium, 1	Berberis, 1
Verbascum, 1	Fedia, 1	Juniperus, 2
Arabis, 1	Viola, 1 (peculiar)	Pinus, 1
Draba, 1 (peculiar)	Sedum, 1	Muscari, 2
Malcomia, 1	Cyclamen, 1	Ornithogalum, 1
Polygala, 1 (peculiar)	Galium, 2	A single grass and a fern (<i>Cheilanthes</i>).

"On the limestone station at Cragus we gathered forty-three species. They belonged to the following genera :—

Ranunculus, 2	Brassica, 1	Galium, 1
Aubrietia, 1	Draba, 2	Anthemis, 2
Matthiola, 1	Cochlearia, 1	Ajuga, 1
Thlaspi, 1	Arenaria, 1	Clinopodium, 1

<i>Lamium</i> , 1	<i>Anchusa</i> , 1	<i>Pinus</i> , 2
<i>Cynoglossum</i> , 1	<i>Sabulina</i> , 1	<i>Scilla</i> , 1
<i>Myosotis</i> , 1	<i>Silene</i> , 1	<i>Alyssum</i> , 1
<i>Geranium</i> , 1	<i>Viola</i> , 1 (tricolor)	<i>Ornithogalum</i> , 1
<i>Corydalis</i> , 1	<i>Sedum</i> , 1	<i>Tulipa</i> , 1
<i>Astragalus</i> , 1	<i>Cerithe</i> , 1	<i>Fritillaria</i> , 1
<i>Prunus</i> , 1	<i>Acer</i> , 1	<i>Myogalum</i> , 1
Umbelliferous plant in bud, 1	<i>Juniperus</i> , 1	And two grasses.
<i>Cerastium</i> , 2 (different from those at Balbura)		

"The vegetation of the tertiary plains and hills is similar to that of the softer and more chalky portions of the limestone. On them the species of *Ophrys* are most abundant. The plants of the travertine plain of Pamphylia are those of the neighbouring limestone. The more recent calcareous formations, both soft and hard, however, do not bear the luxuriant arborescent vegetation which flourishes on the older. The sandy plains near the sea, and those of alluvial origin, are inhabited by many species not found elsewhere; these we have already noted when describing the succession of plants observed during our journey in spring.

"The sea-weeds of the Lycian shores are those of the rest of the *Ægean*. Along the coast line *Padina pavonia* and *Dictyota dichotoma* are abundant. Deeper, and usually on muddy ground, to a depth of several fathoms, grow the vivid green and elegant fronds of *Caulerpa prolifera*, which, when enumerating the fishes, we have shewn to have probably been the sea plant called *Prasium* by the ancients. The curious sponge-like *Codium bursa*, the *Sargassum salicifolium*, species of *Cystoseira* and *Sporochnus*, *Haliseris poly-podioides*, and *Dictyomenia volubilis*, may be taken along with the *Caulerpa*. The *Dictyomenia*, conspicuous on account of its stiff cork-screw-like purple fronds, has a great range in depth, since we dredged it even in fifty fathoms of water, associated with *Ritiphlæa tinctoria* and *Chrysimenia uvaria*. *Codium flabelliforme* occurred at the entrance of the gulf of Macri in thirty fathoms, associated with that rare and curious vegetable net, the *Microdictyon umbilicatum*. Below fifty fathoms no flexible sea-weeds were observed. The coral-like *Millepora polymorpha* took their places, and ranged even as deep as one hundred fathoms. Beyond that depth we found no traces of vegetable life, unless some of the minute and microscopic infusorial bodies there living be regarded as plants."—Vol. ii. p. 150.

In concluding our brief notice of these volumes we must again invite attention to the extreme beauty of the engravings which exhibit

the sites and plans of cities and also to the very elaborately finished map at the end of the second volume. We heartily wish the work may meet with a speedy sale and that the views in future editions may be produced in any other garb than the doleful one in which they now appear. We see the style has been patented : we sincerely hope that no pirate will even infringe on the rights of the patentee.

K.

BOTANICAL SOCIETY OF LONDON.

November 30, 1846.—Tenth Anniversary Meeting; J. E. Gray, Esq., F.R.S., &c., President, in the chair.

The Secretary read the Annual Report of the Council from which it appeared that 27 new members had been elected since the last anniversary, and that the Society now consisted of 201 members. Many thousands of specimens of British and Foreign plants had been received, and much exertion had been used by the Herbarium Committee to obtain the rarer British plants, which had been attended with success, valuable and interesting specimens (including many duplicates) having been received, and which would shortly be distributed to the members. The Report was unanimously adopted. A Ballot then took place for the Council for the ensuing year, when the President was re-elected, and he nominated John Miers, Esq., F.R.S., and Edward Doubleday, Esq., F.L.S., Vice-Presidents. Mr. J. Woollett, Mr. G. Cooper and Mr. James Rich, were elected new members of the Council in the room of Dr. Bossey, Mr. J. G. Children, and Dr. Palmer. Mr. J. Reynolds and Mr. G. E. Dennes were re-elected Treasurer and Secretary.

Portraits of the President and Hewett Watson, Esq., F.L.S., (painted by Mrs. Carpenter), subscribed for by the members, were presented.

BOTANICAL SOCIETY OF EDINBURGH

December 10, 1846.—Professor Balfour, President, in the chair.

The following donations were announced, viz. Scottish Alpine plants from Dr. Balfour; Cryptogamic plants, chiefly Fungi, from M. Kretschmar, Sonnewalde,—this collection contained about 2500 specimens most beautifully preserved; German plants from Major de

Gansauge, Berlin; and specimens from the south of France, from M. Barneoud, Paris.

The following gentlemen were admitted Fellows of the Society, viz:—John Robertson Esq., 7, Torphichen Street; James Lumsdaine, Esq., 15, Dundas Street; Archibald Douglas, M.D., F.R.C.S., 61, Northumberland Street; and John Marshall Jun., Esq., 9, Fettes Row, as resident; Thomas Bodenham, Esq., Abbey Foregate, Shrewsbury, non-resident; and Ph. Wirtgen, Coblenz; Mr. J. Zohr, Trier; Dr Molkenboer, Leyden; Dr Carl Heinrich Schultz, Zweibrücken, were elected foreign members.

A letter was read from M. Lange and other Danish botanists, offering to supply Scandinavian specimens in exchange for British; and transmitting a catalogue of the Danish Flora, with the regulations of the Scandinavian Association for the exchange of Botanical specimens. In the list there are 1285 Phanerogamous species enumerated, 263 of which are not found in Britain; and 39 species of Ferns, of which six are not British.

The following communications were read:—

1. Dr Balfour read an account of a botanical trip which he had made with some of his pupils to Clova, Glen Isla, and Braemar, in August last. Dr B. alluded in an especial manner to the alpine Flora of the British Isles, the Scandinavian type of Professor F. Forbes; and illustrated it by a complete series of specimens, arranged according to the Natural System on pasteboard, so as to be seen at one view. He noticed Professor Forbes' theory, as to the mode in which the plants migrated at the Glacial Epoch. He also alluded to the geological nature of the district visited, which is the richest in Britain as regards alpine species, and the character of the Flora on the different kinds of primary rocks, especially granite and mica-slate. Specimens of the rarer species collected during the excursion were exhibited, among which the following are interesting as having been found in new localities, or re-discovered, in old ones:—*Carex rupestris*, abundant in Glen Dole, the specimens being unusually large; *Poa Balfourii*, near the falls of the Whitewater, and also in Glen Isla, and on Lochnagar; *Poa cœna*, in Glen Isla; *Poa laxa*, and the variety *flexuosa*, of Parnell, Lochnagar, and Glen Dole; *Luzula arcuata*, Lochnagar; *Saxifraga rivularis*, in several new stations on Lochnagar, some specimens 6 inches long; *Gentiana nivalis* in a new spot in Glen Isla, specimens varying from one 10th of an inch to 6 inches in length; *Ranunculus acris*, var. *pumilus*, Wahl. Lochnagar; *Phleum alpinum*, rocks near Loch Brandy; *Carex vaginata*, abundant

on Ben na Muick Dhui; *Carex curta*, var. *alpicola*, or *C. Persoonii*, near the summit of Lochnagar; *Woodsia hyperborea*, rocks in Glen Phee; *Hieracium nigrescens*, Ben na Muick Dhui; and *H. inuloides*, var. *latifolium* of Fries, in Glen Clova.

Dr. Fleming expressed doubts as to the correctness of Professor Forbes's theory regarding the migration of the Scandinavian Flora, and noticed the evident depression of the land along the eastern coast of Scotland, from which he inferred that the level of the German Ocean must have been greatly altered, and was inclined to believe that the similarity of the Floras of this country, and of Norway and Sweden, might be accounted for by supposing that these countries were at one time united to Britain.

2. Read, extracts from a letter from Dr. W. H. Campbell, Demerara, giving account of an excursion up the Essequibo river, in the course of which he saw *Victoria regia* in a lake or lagoon, about half a day's journey above the Itabally rapids. He described the petioles as densely covered with prickles, and varying from fifteen to twenty feet in length, the leaf itself being five or six feet long. He also procured specimens of the root and bark of the plant which yields the Hiarry poison, which he describes as a huge *bush-rope*, or climber. Unfortunately, neither the *Victoria* nor *Hiarry* plant was in flower. The latter is being analyzed by Dr. Sheer, the agricultural chemist at Demerara.

Dr. Douglas MacLagan stated that he had already made an analysis of the *Hiarry* root, and had detected a peculiar volatile acid, to which he believed the poisonous properties of the plant were due.

3. Read, a Supplement to a 'Synopsis of the British Rubi,' by Charles C. Babington, M.A., Cambridge. In this communication two new forms are described, viz., *Rubus glandulosus*, var. *dentatus*, and *R. Gunteri*, *Weihe*.

Specimens of *Trichinium*, collected by Dr. Learmonth, in Australia, were exhibited; and the peculiar structure of the calycine hairs shown under the microscope.

At this meeting the election of office-bearers for the ensuing year took place, when Dr. R. K. Greville was elected president, and Dr. Archd. Inglis, Sir Wm. Jardine, Bart., Professor Balfour, and Rev. Dr. Fleming, vice-presidents.—*W. W. E.*

*Panegyric on Mr. M'Alla and other Irish Botanists.** By CHARLES FARRAN, M.D., Honorary Fellow of King and Queen's College of Physicians, Ireland.

IT was with feelings of great regret I lately read in the May number of the 'Phytologist' a paper entitled "Botanical Rambles in Ireland," by Charles Carter, Esq. It contains, within a very narrow space, a number of inaccuracies, I am confident committed inadvertently by the writer, and I am free to confess that the ignorance of the facts connected with the subject to which he refers (and to which I am now about to advert) is so very apparent, that it completely exonerates the writer from wilful misrepresentation. Thus, for instance, in the second paragraph of his Rambles he states "that being in Clifden (Galway) he had heard of Mr. Ogilby, as an accomplished naturalist and botanist, being there. He had discovered another station for the beautiful *Erica Mackaia*, a heath admired by all, but which that gentleman (who originally found it) I am informed now considers to be a mere form of the more common species." I am not going to quarrel with the assertion that Mr. Ogilby is an accomplished botanist: that he is one of the most successful cultivators of the rarer native plants is with one general consent acceded to him; and no one has viewed his fine collection with feelings of more intense pleasure than myself, but giving him all the credit he deserves on this head, and in addition, that he has discovered a second locality for this beautiful heath, I must most emphatically deny his having the slightest right, or the shadow of a claim, to be considered the discoverer of this splendid addition to the Flora of Ireland.

The facts connected with the discovery of this heath present a lamentable instance of men of science reaping where they had not sown, enjoying a golden harvest of honours, wearing laurels (perhaps heaths) they never won, from the unrequited labours of an humble individual, and thus totally excluding the discoverer from any participation in the credit justly due to him for his great discrimination. I shall now give you, Sir, the correct account of the discovery as I

* We feel at a loss to give a proper heading to this article, but think the above most appropriate. Messrs. M'Alla, Scouler and Litton being still, we trust, in the land of the living, we at first regarded the inflated terms of their panegyrist as rather objectionable; but our neighbours of the "Green Isle" are accustomed to use stronger terms than we more phlegmatic English: and therefore the necessary allowance will be made by all our readers. We have long been acquainted with Mr. M'Alla's deserved reputation, and our best wishes attend him in all his researches.

had it from Mr. William M'Alla, to whom alone the merit belongs. He says, that being engaged some eight or nine years ago in procuring litter for his father's cattle, he selected a spot where a heath less robust than *Erica cinerea*, and consequently better adapted for that purpose, grew abundantly. When thus engaged he perceived some peculiarity in its structure which struck him as singular. He at once compared it with *E. tetralix*, and the result of that examination confirmed him in his opinion. He immediately ceased pulling it, and accurately marking the locality, waited with somewhat of impatience the season of its blossoming. It so happened that Mr. Babington, accompanied by Mr. J. Ball, of Dublin, visited Connemara the following summer, and having spent some days in that delightful country, were about leaving it (literally being on the car), when Mr. M'Alla asked Mr. Babington would he wish to see a new heath. He thought Mr. M'Alla was passing a jest on him, but in this he was quickly undeceived; for Mr. M'Alla brought him to the spot where it presented its beauteous blossoms in wild luxuriance. I need scarcely attempt to describe the delight expressed by Mr. Babington, who, taking away some specimens, exhibited them to Mr. Mackay on his arrival in town, and subsequently named the heath after that gentleman. Now whether Mr. Babington, in taking this step, acted with that strict sense of justice to the discoverer, his own mind will best inform him. But for my own part I do not hesitate to say, that I cannot but look on it as an act of the greatest injustice; and I think it would have reflected greater brilliancy on Mr. Mackay's high reputation if he had rejected the compliment and bestowed the honour on him who had so richly deserved it. However, the Horticultural Society of Ireland, in a proper spirit, awarded a silver medal to Mr. M'Alla for this and several other additions made to the Flora of Ireland by him, thus recognizing, at that early period, his undoubted right to the honour of having discovered the plant.

Having thus demonstrated the inaccuracy of the commencement, Mr. Carter continues and finishes his sentence by saying, "and his views are concurred in by his friend, the Professor of Botany in the Royal Dublin Society, one of the first indigenous botanists in Ireland." This finishing part of the sentence contains no less than three additional inaccuracies. I am most strongly inclined to think that the gentleman designated (as his Mr. Ogilby's friend) the Professor of Botany in the Royal Dublin Society, is Mr. David Moore, Curator of the Botanic Gardens at Glasnevin, and not Professor of Botany to the Royal Dublin Society (and may the time be far distant

when the opportunity shall occur of his being so), that chair being most ably filled at present by Doctor Samuel Litton, a gentleman so universally known for his *profound acquirements in the varied branches of science* that he obtained the name of "*the scholar*" from the late Dr. Magee, Archbishop of Dublin (no mean authority on such a subject), and whose lectures impart such a grace and dignity to the science of Botany. I think if his (the Professor's) opinion was required as to *Erica Mackaii* being a mere form of the more common species, what species is that? that his reply would be, that if so *Menziesia polifolia* was only a mere form of *Calluna vulgaris*, a most unphilosophic and unbotanic induction. As to Professor Dr. Litton being an indigenous botanist, I have been much puzzled in endeavouring to decipher the meaning of this expression. If it means that Dr. Litton is a native of this country, Mr. Carter is correct, Ireland is the country of his nativity, and I feel assured that no person is better acquainted with the Botany of it. But if, in carrying out the mistake, Mr. Carter makes Mr. Moore indigenous to the soil of Ireland, he is very inaccurate, Mr. Moore being a Scotchman, and one who has earned, since his sojourn in the land, the reputation of being a sound botanist, but no more indigenous to the soil of Ireland than I am to that of Kamskatka.

I trust I have put this correction into a clear and intelligible form; but I feel that I should not be doing justice either to Mr. Ogilby or to Mr. M'Alla if I withheld what in my own opinion is the probable origin of Mr. Carter's mistakes. Mr. Ogilby, some years since, visited Connemara, and during his botanical investigations had the good fortune to discover the *Adiantum Capillus-Veneris*, growing in a calcareous seam which occurs in the hornblende rock (of which Urrisbeg is composed, based on granite), certainly a most unlikely habitat for this interesting fern, and displays, in a most favourable manner, Mr. Ogilby's power of research as a botanist. Now from the fact of Mr. M'Alla residing in the neighbourhood, and from his being able, from Mr. Ogilby showing him the locality, to send specimens of the fern to a number of botanists, it was supposed that he had discovered it. Even Mr. Newman, the author of the work on the British Ferns, falls into this mistake when describing the localities of the *Adiantum* in Ireland; for he says, "and Mr. J. M'Calla (it should be William), a most industrious and praiseworthy young botanist, residing in Roundstone, in Connemara, found a few plants at the foot of a rock facing south-west, on the banks of Lough Bulard, near Urrisbeg." But this erroneous opinion was rectified the very first opportunity, at

a meeting of the Dublin Natural History Society, by Mr. M'Alla unreservedly stating that the merit of the discovery belonged exclusively to Mr. Ogilby, and thus you perceive, Sir, by a species of metatasis, the credit due to Mr. Ogilby's discovery of the *Adiantum* was transferred to the heath of Mr. M'Alla's finding. Having thus rectified the inaccuracies of Mr. Carter's "Botanical Rambles," I trust I shall be excused if I have in any way transgressed the fair limits of criticism, or for any warmth of expression which may have escaped from me, ascribing such to the indignation I feel at the treatment which this "young and praiseworthy botanist," I will add zoologist, has received at the hands of those who should have had "bowels of mercy and lovingkindness" towards him; and combined with these the admiration I entertain for his abilities, displayed in almost all the branches of Natural History, has compelled me to use it. And now it may not be out of place to say a few words in respect to Mr. M'Alla: they may be useful to those, who, like him, have an ardent thirst for knowledge, and labour under the difficulties which straitened means invariably oppose to the acquirement of information.

At the period of Mr. Babington's and Mr. Ball's visit to Connemara he was a young man, poor and pennyless; of this he need not be ashamed, it should be a source of honest pride to him; but if this was the case, he was possessed of an indomitable zeal for Natural History, an intense love of the science, and indeed he required those assistants in the many and severe discouragements he met with in the prosecution of his darling pursuit. And in none did he feel those discouragements more than in this transaction of the heath; finding by it that he was deprived of all participation in the merit of the discovery, and one marked by a power of discrimination which falls to the lot of few botanists; it was the first fair opportunity that had occurred in his course, the first gleam of sunshine, the first fulcrum by which he might have risen in public estimation, and thus been placed in a position favourable to the development of those talents he is so eminently gifted with. These bright prospects being torn from him, was quite sufficient to crush the hopes, the very mind of a less ardent votary than Mr. M'Alla. But it was not so with him; he has persevered in his noble course: and if it should be enquired of me, where and what is he now? I should answer, examine that lasting memorial of talent and research, Doctor Johnston's work on the British Sponges and Corallines. You will find him alluded to in almost every page of that capital work. Again, take up Dr. Harvey's '*Phycologia Britannica*, *no terms can express the admiration in which that work is*

held—you will find him mentioned in almost every page. Look at the first volume of his own 'Algæ Hibernicæ.' Can anything exceed the beauty of his specimens? Read Doctor Harvey's eulogium in that volume. Examine the splendid collection of Irish Zoophytes—sponges, Crustacea and Millepores,—made by him for the Museum of the Royal Dublin Society. And not to occupy too much of your valuable space, hear what Doctor Scouler, the *most accomplished naturalist of the day (in the strictest sense of the word)* says about him at a meeting of the Dublin Natural History Society, held on Wednesday 9th Decr. 1846. Dr. Scouler read a paper on some new species of Zoophytes; among the first he mentioned was the Ophiurilla, a new and hitherto undescribed species from the west coast of Ireland, discovered last summer by Mr. M'Alla. Dr. Scouler also entered into a very detailed history of a new genus of sponges discovered in Connemara about two years since, by the indefatigable industry of Mr. M'Alla, who, of all Irish naturalists had been the most successful in detecting new and rare species of this curious family. The new genus, to which Dr. Scouler gave the name of Amphitrema M'Callai, was characterized by some very interesting particulars, which Doctor Scouler enumerated, and then proceeded to advert to the number of Crustacea which Mr. M'Alla had added to the Fauna of Ireland, Thia polita, and Stenosoma acuminata, being amongst the number, and concluded by saying that he was equally successful in the Mollusca, and among other interesting species had discovered the Pholas clavata, a West Indian species of boring shell, recorded for the first time as Irish.

This is but a faint outline of Mr. M'Alla's researches, which have been crowned with such success. I consider that in thus recording them, I am only doing an act of common justice, by removing any erroneous impressions which may have arisen by Mr. Carter's inadvertence in his Botanical Rambles. I wish the task had fallen into more competent hands; but I have endeavoured to do it honestly.

CHARLES FARRAN.

Stradbally, Kilmacthomas, Co. Waterford,
December 22nd, 1846.

Remarks on the Ferns occurring at Lynmouth, North Devon.

By the Rev. W. T. BREE, M.A.

————— “*Multa petentibus*
Desunt multa.”—HOR.

DURING a recent sojourn at Ilfracombe, North Devon, I took the opportunity, towards the end of October, of paying a two-days' visit to those romantic spots, Lynton and Lynmouth, about twenty miles distant from the former place. The far-famed “Valley of Rocks” I confess somewhat disappointed me. But nothing of the kind can surpass the beauty of the deep glens of the west and east Lyn, their steep sides richly clothed with wood, oak,* ash, birch, &c., and a deliciously limpid stream, bright as crystal, tumbling among the rocks in the bottom, and forming a succession of waterfalls and rapids in every variety of picturesque shape and beauty. A landscape painter might live here and work all his days, and die contented. These rocky glens might seem to be the *very seat* of ferns; and accordingly they grew there in the greatest profusion and luxuriance, —they *enjoyed* themselves. There were large masses of *Polypodium vulgare*, exceeding in extent all that I had ever seen before; and the fronds, in many instances, were nearly the length of the umbrella I carried in my hand. *Polystichum aculeatum*† (or as some might call it, *angulare*, or rather, both forms of the plant) grew in the greatest vigour, and of a gigantic size, as did also *Scolopendrium vulgare*, and some other species. I feel very much disposed to trouble you with a list of the ferns I met with in this charming spot; not that the list is at all a copious one, at least not for so favourable a locality, nor does it comprise anything that can be considered rare; quite the contrary; the list is short, and includes only the commoner species. But my object is rather to show what I did *not* find, and yet should have fully expected would occur in this most suitable situation. The list is as follows:—

* Almost, if not entirely, all the oaks in this district are of the species *Quercus sessiliflora*.

† I confess I cannot see the propriety of making three species out of *Polystichum aculeatum* and *lobatum*, so well understood by Ray (see his *Synopsis*). All the varieties of these very variable ferns, as it appears to me, may readily be referred to one or other of the two species, *aculeatum* or *lobatum*. Neither can I subscribe to the doctrine, which I have heard broached, that “we must make *three* species, or sink them all to *one*.” I almost think we might with as much propriety make *four* species as *three*.

Blechnum boreale.

Pteris aquilina

Polypodium vulgare

Polystichum aculeatum

—— *angulare*

Lastræa Oreopteris

—— *Filix-mas*

—— *multiflora* (Newman, *dilatata* of authors)

Athyrium Filix-fœmina

—— *var. irriguum*

Asplenium Adiantum-nigrum

—— *Ruta-muraria*

—— *Trichomanes*

Scolopendrium vulgare.

Now with the exception of *Athyrium Filix-fœmina*, *var. irriguum*, there is not in this list a single fern but what I have heretofore found wild in my own parish of Allesley, along with at least two other species besides. To the above inconsiderable list of not uncommon species, I perhaps might be justified in adding *Osmunda regalis*; for true it is, I saw two separate plants of it growing in a healthy state near the stream in Sir W. Herries's grounds, on the west Lyn; but to my eye it was at once evident that these were not indigenous, but had been introduced by the hand of man; and, what confirmed me in this opinion, not a single specimen besides was observed in any other part of either of the glens. I have formerly seen this noble fern in South Devon, particularly at Dawlish, in great vigour; but I have not observed it anywhere during my late rambles in the northern parts of the county. I met with no species of *Lycopodium* in the Lynmouth glens; though from information derived from one of the women who attend visiters with donkeys, I have no doubt that *L. clavatum* at least, is found there, or in the neighbourhood. I have stated already that *Polystichum aculeatum* grew in great abundance and luxuriance; but its near ally, *P. lobatum*, does not occur at Lynmouth, so far as I observed. This last fern, though by far the more common of the two species in our Warwickshire lanes in my own immediate neighbourhood, appears to be much less generally distributed than *aculeatum* and *angulare*. *Lastræa recurva* (Newman) is a local species, and accordingly I was not surprised at the time by not finding it in the glens of the West and East Lyn. Subsequently, however, I have met with it rather sparingly in a valley called Chambercombe, about a mile from Ilfracombe, and also more plentifully in

one situation near Barnstaple, by the side of a small stream artificially conducted to supply a paper mill, just two miles from the Ilfracombe road. Devonshire, therefore, may be added as a *new* locality (so far as I know) for this very beautiful, and, as it seems to me, distinct species. Being, as it is, a native of the district, why it should not have taken up its quarters on the delightful banks of the Lyn, is a question on which I will not now hazard a conjecture; but there I found it not; and it is too conspicuous a plant to be readily passed over by any one on the look-out for ferns. What surprised me most of all was the non-appearance of *Cystopteris fragilis*, and all its various forms, at Lynmouth, and, I may add, of *Polypodium Dryopteris* and *Phegopteris*, and of *Lycopodium Selaginoides*. The moss-grown rocks of Lynmouth, perpetually bedewed with the spray of the waterfalls, are just the very spots where one would look to find some species of *Hymenophyllum*, or perhaps even — considering the mildness of the Devonshire climate — of *Trichomanes*. I searched most diligently after *H. Wilsoni*, but in vain, though the rocks seemed formed and placed on purpose for its growth. The following, then, are the ferns which I should have expected to meet with at Lynmouth, but which, so far as my researches extended, do not appear to grow there:—

Cystopteris fragilis

Polypodium Dryopteris

—— *Phegopteris*

Polystichum lobatum

Lastræa recurva

Hymenophyllum Wilsoni

Lycopodium Selaginoides

Osmunda regalis?

I avail myself of the present opportunity to state that I had the satisfaction, in October last, of seeing the elegant and rare *Adiantum Capillus-Veneris*, flourishing at large on the cliffs facing the sea near Rillidge point, about two miles from Ilfracombe. And I am glad to be able to add that it is not very likely to be soon eradicated from the spot; for the fern grows high up on the perpendicular side of the cliff, under the drip of a small watercourse, and the assistance of two men, with ladders, is required in order to approach it. Accordingly it is out of the reach of wanton spoliation. I had afterwards the further pleasure of finding small specimens of ‘maiden’s hair’ in another situation at no great distance, and gathering it with my own hands; but from this last spot, which is more accessible, it has been almost

eradicated. I may here state, for the benefit of botanists who visit Ilfracombe and may wish to obtain the fern, that a young man of the name of John Cutliffe, who resides at Heale, about a mile from Ilfracombe, knows the plant, and where to find it, and is ready to procure it when required. Of course he expects to be reasonably remunerated for his time and trouble, and, indeed, deserves to be so; for it is a service attended with labour and some risk: the ladders required for the occasion have to be carried a mile, and conveyed down the cliff by a very awkward, if not dangerous path, and afterwards over the rugged rocks on the shore. J. Cutliffe and his father were both drenched to the skin in procuring the fern for me.

I have to apologize for these rambling remarks chiefly about what is *not* found in a particular locality of North Devon. You are, of course, at full liberty to make any use of them for the pages of the 'Phytologist,' or to reject them as you may think proper. To me, however, the subject is by no means without interest.

W. T. BREE.

Allesley Rectory,
December 10, 1846.

Occurrence of Lythrum hyssopifolium near Manchester.

By R. W. M'ALL, Esq.

ALMOST on the day of my return from a vain search, in which I believe I had been preceded by others, hapless as myself, on the inviting banks of Trent, by rural Wilford, in sight of merry Nottingham, for the retiring and transitory hyssop-leaved loosestrife (*Lythrum hyssopifolium*), said once to have flourished there, I was not a little surprised to meet the very object of my pursuit where I least expected it. It had been gathered for me in the month of August, at Rusholme, near this town, in a damp field, by a narrow watercourse, amidst the rush-clad clay beds, and close by the iron-railed enclosures which abound in our vicinity. The specimens were few in number, but of average size and well developed. They grew in a retired corner, which, though within a short space of busy scenes, seemed to have been long undisturbed. As the plant is rare and local, and particularly infrequent in this part of England, it may be interesting to your readers to know that it belongs to the Flora of Manchester. The

rude hand of innovation will, no doubt, soon obliterate the trace of the little wanderer; but its memory may thus be preserved from oblivion.

R. W. M'ALL.

Green Heys, Manchester,
20th January, 1847.

BOTANICAL SOCIETY OF LONDON.

1st January, 1847.—John Reynolds, Esq., Treasurer, in the chair.

Donations to the library were announced from Sir R. I. Murchison, Mr. John Miers, Mr. John Woollett, Mr. Van Voorst, Mr. A. Gerard and Mr. F. Crisp. British plants had been received from the Rev. G. W. Sandys, Dr. Lemann, Dr. T. B. Salter, Mr. J. Sidebotham, Mr. F. P. Pascoe, Mr. F. Townsend, Mr. J. Tatham, Jun., Mr. W. Andrews, Mr. J. Brown, the Rev. T. Butler, Mr. C. Prentice, Mr. G. E. Dennes, and the Botanical Society of Edinburgh. Mr. T. Westcombe exhibited specimens of a *Carex* differing from *C. ovalis* by its long, foliaceous bracts, but believed to be a variety of that species, and probably identical also with the *Carex argyroglochin* of Hornemann. The specimens being in their flowering stage only, the form of the mature fruit cannot be ascertained; but in the characters which are obvious the specimens correspond with the description of *C. argyroglochin*, as given in Kunth's *Enumerata*. Mr. Browne communicated a paper "On the Potato Disease."—G. E. D.

"On the Physiology and Organography of the Sensitive Plant, and other Plants having regular periods of rest. By M. FEE."

THE following is a summary of the results of the author's researches, as communicated by him to the Académie des Sciences, in a memoir bearing the above title, which was read on the 21st of September, 1846.* He says:—

"In order to account for the movements exhibited by the sensitive plant, and other excitable species, it is not necessary to suppose the intervention of the action of muscular fibre, or even of that of apparent nerves. In the animal kingdom a crowd of active beings execute

* Reported in the 'Nouvelle Revue Encyclopédique' for October, 1846.

very complicated movements, without our being able to discover the slightest trace of a nervous system.

"The cells of vegetables are contractile; and exciting agents act upon them directly, without the intervention of any intermediate body. The vascular tissue, being highly elastic, readily yields to the motion impressed on the cellular tissue.

"We may regard the cellular tissue of the sensitive plant as being erectile in its nature. When it is in a state of active dilatation, the plant is turgid, and its leaves are spread out; when the tissue is in a contracted condition, the plant closes its leaflets and lowers its petioles.

"In a state of active dilatation, the fluids of the plant fill the cells of the lower surfaces, and maintain them in a state of turgescence.

"In a state of contractibility the fluids, being less abundant, leave the cells of the upper surfaces hanging down and pressing upon the lower surface.

"In this way we may explain the normal diurnal and nocturnal movements of the sensitive plant. In the day time, when the plant is exposed to the light, the fluids are attracted towards the cuticle, and there maintain a constant equilibrium, the fresh supplies replacing those which had passed off by evaporation. If this equilibrium is interrupted by a touch, by cold, or by wounds, the circulation is disturbed; the fluids suddenly abandon the cells of the upper surfaces, dilate the vessels by the reaction, and a state of contractibility is the consequence.

"At the approach of evening, the fluids being less strongly propelled towards the superior surfaces, a condensation of the tissues ensues; the plant contracts, and in the night the phenomenon attains its maximum of intensity, ceasing gradually at the return of day. Darkness opposes no obstacle to the diurnal state of sleeping leaves: it even serves to maintain this state, and tends to keep the leaves displayed.

"When plants are placed in darkness, in a cool cellar, where the air is loaded with humidity, their waking state may endure for many days.

"If plants in a waking state are suddenly shifted from warm to cool air, they assume their sleeping state, if there is a considerable difference in the temperature.

"If such plants are watered when in their waking state in a dark place, they immediately enter upon their sleeping state, which, however, does not last long.

"If such plants are brought, whilst they are awake, from the darkness of a cellar into the open air during the night, they slowly assume their sleeping state.

"In a warm cellar situated but little below the surface of the ground, or in a dry room from which the light is carefully excluded, the same events occur to such plants as if they were in a deep cellar, though less perfectly.

"Complete darkness neither increases nor diminishes the sensibility of *Mimosa pudica*.

"*Oxalis annua*, the flowers of which, in the open air, open only towards the middle of the day, remains in flower both night and day in darkness.

"*Porleria hygrometrica* is insensible to the hygrometrical variations of the atmosphere, and assumes the condition of all the other sleeping plants, although it is much more excitable.

"We need not search among leguminous plants for such as most readily assume the sleeping condition; for *Phyllanthus cantoniensis* and *Porleria hygrometrica*, one belonging to the *Euphorbiaceæ* and the other to the *Rutaceæ*, ought to stand at the head of the list."

The above conclusions may account for some of the phenomena of vegetable motions, but there are many others, even among the plants which M. Fée has chosen for his experiments, that can in no wise be referred to this cause, which seems much less satisfactory than Dutrochet's theory of exosmose and endosmose, though in some measure approximating to it. That theory clearly explains such phenomena as are exhibited by the ripe fruits of *Momordica elaterium* and *Impatiens*; and in the latter plant the phenomena may be inverted by placing fresh valves of the fruit in sugar and water, which, by producing exosmosis, gradually straightens the curved valves and then curves them in an opposite direction. But neither the theory of endosmosis, nor M. Fée's modification, will account for the peculiar movements of the leaves in *Hedysarum gyrans*, in which, while the terminal leaflet is asleep, the two lateral leaflets are in continual motion, even during the night.

That plants possess a system of organs somewhat analogous to the nervous system of animals, seems at least to be rendered probable by the results of experiments with various irritant and narcotic poisons, upon such plants as exhibit, under ordinary circumstances, any pe-

culiar evidences of irritability. The researches and experiments of M. Marcet, Drs. Christison and Turner, and M. Macaire, lead to this conclusion: the latter gentleman's experiments on the sensitive plant (*Mimosa pudica*) are so interesting, that they will bear repetition here, even though some of our readers may be already well acquainted with them.

"Experiments were now made with this vegetable (*Mimosa pudica*). When a leaf of this plant is cut, and allowed to fall on pure water, the leaflets generally contract rapidly; but after a few moments expand, and are then susceptible of contraction by the touch of any other body. They may thus be preserved in a sensible state two or three days. If the section be made with a very sharp instrument, and without concussion, the leaves may be separated without any contraction. The branches of this plant may be preserved for several days in fresh water. Gum-water also effects the same purpose.

"When a cut leaf of this plant falls upon a solution of corrosive sublimate, the leaf rapidly contracts, and the leaflets curl up in an unusual manner, and do not again expand. When put into pure water, the sensibility does not return, but the whole remains stiff and immovable. A little solution of corrosive sublimate being put into a portion of pure water, containing an expanded branch of the plant, gradually caused curling up of the leaves, which then closed and fell. If the solution be very weak, the leaves open on the morrow, and are still sensible, but ultimately contract, twist, and remain stiff till they die. Solutions of arsenic and arseniate of potash produce the same effects.

"A leaf of the sensitive plant was placed in a cold, diluted solution of opium: in a few moments it opened out as in water, and, after half an hour, gave the usual signs of contractibility. In six hours it was expanded, and had a natural appearance, but could not be excited to move. The leaflets were flexible at the articulations, and offered a singular contrast to the state of irritation produced by corrosive sublimate. Pure water did not recover the plant. A large branch, similarly situated, expanded its leaves; but in half an hour had lost much of its sensibility: the leaflets, though alive, seemed asleep, and required much stimulating to cause contraction. In one hour the contractions ceased: in two hours the branch was dead.

"A leaf placed in Prussic acid (Scheele's strength) contracted, then slightly dilated, but was quite insensible, and the articulations were flexible: water did not recover it. If the acid be very weak, the leaflets dilate and appear to live, but are insensible. A drop of

the acid placed on two leaflets of a healthy plant gradually causes contraction of the other leaflets, pair by pair. Solutions of opium and corrosive poisons have no effect when applied this way. After some time they dilate, but are insensible to external irritation: the sensibility returns in about half an hour; but the leaflets appear as if benumbed.

"The plant exposed to the vapour of prussic acid is affected in the same way: ammonia appears to favour the recovery of the plant.

"A cup containing dilute prussic acid was so placed that one or two leaves, or sometimes a branch, of a healthy plant could be plunged into the liquid, or left to repose on its surface. The leaflets remained fresh and extended, but were almost immediately insensible. Being left in this state for two hours, they were expanded; and no irritation could cause their contraction, though otherwise there was no appearance of an unnatural state. At five o'clock in the evening the leaves were left to themselves. At nine o'clock they were open and insensible. At midnight they were still open, whilst all the rest of the plant, and the neighbouring plants were depressed, contracted, and in the state of sleep. On the morrow they resumed a little sensibility, but seemed benumbed.

"In the same manner M. Macaire has interfered with other plants as to the state of sleep, and observes that prussic acid thoroughly deranges the botanical indications of time of Linnæus."—*Lindley's Introduction*, 294.

MICROSCOPICAL SOCIETY.

October 14th, 1846.—J. S. Bowerbank, Esq., F.R.S., President, in the chair.

A paper by John Anthony, Esq., on a method of rendering the appearances in delicate structures visible by means of oblique transmitted light. This method depends upon the placing the object in such a position that the fine lines or other delicate markings are exactly at right angles to the illuminating rays, when these lines, &c., will be at their maximum of distinctness, and thus tissues may be rendered distinctly visible whose existence, when viewed in the ordinary manner, might be considered as exceedingly doubtful. The object employed to illustrate this position was the Navicula of the Humber, one of the most delicate of test-objects, which, under ordinary circumstances, appears perfectly transparent, but when viewed

in this way, not only exhibits a double set of lines, but also transverse lines, giving the whole the appearance of being covered with a delicate net-work. Four drawings of this object were exhibited, showing it in as many different positions, making a complete revolution of the field in which the the markings first mentioned were distinctly visible. In order to bring out these appearances it is necessary that the light should be very oblique, and must be passed laterally through the "bull's eye" in such a manner that the object (the Navicula) may appear of an intensely blue colour, nearly opaque. The stage is then to be gradually turned round until the shell is in the position to be best seen as described.

December 9th, 1846.—J. S. Bowerbank, Esq., F.R.S., President, in the chair.

A paper "On the application of Polarized Light in Microscopic Observations," by Mr. Legg, was read. After noticing the remarks of Dr. Brewster respecting the advantages likely to be derived from the application of polarized light in the microscopic examination of delicate structures, Mr. Legg described a series of polarizing apparatus which may be readily adapted to almost any microscope, consisting, 1st, of a bundle of plates of crown glass, from which the light is to be reflected at an angle of 56° , in which position one portion only of the light is refracted and another transmitted, each of which portions consists of light polarized in opposite planes. This arrangement is the best adapted to low, single powers. 2ndly, a plate of tourmaline, as free from colour as possible, and cut parallel to the crystalline axis: and 3rdly, a Nicol's, or single-image prism, being a portion of a crystal of Iceland spar, cut, and combined with a piece of glass, so as to throw out of the field of view one of the two images produced by the double refraction of the crystal. This he described as being the most eligible for the compound microscope, inasmuch as it is perfectly free from colour, and requires very little adjustment. He then described a series of experiments illustrating the most striking phenomena of double refraction, in which he employed the Nicol's prism adapted under the stage, a double refractor adapted to the eye-pieces, a film of selenite, of uniform thickness, placed in accordance with its crystalline axis, and a plate of brass, perforated with holes from about $\frac{1}{16}$ to $\frac{1}{4}$ of an inch in diameter. In the first of these experiments, in which the doubly refracting crystal

was placed over the eye-piece, two distinct images appeared, one of which revolved round the other when the eye-piece was turned round, thus showing the ordinary and extraordinary rays. On the second, the Nicol's prism was applied under the stage, the other arrangements remaining the same. Upon turning the eye-piece, although two images are produced, but one is seen when half the revolution is performed, *i. e.* at 180° from the first position. Changes also take place at every other quadrant. In the third experiment, the selenite plate was interposed, the images were now coloured, and presented the complementary colours at every quarter of a circle. When the hole in the piece of brass was of a large size, the images were seen to overlap, and white light was produced. The author concluded with some remarks upon the service likely to be rendered to microscopical investigation by the employment of polarized light." — *J. W.*

BOTANICAL SOCIETY OF EDINBURGH.

Thursday, January 14th, 1847.—Sir William Jardine, Bart., in the chair.

Donations to the library and museum were announced—from Mr. W. Gardiner, Dundee, the second edition of his book on Mosses, and catalogues of Musci and Hepaticæ; from Dr. Bell Salter, Ryde, Isle of Wight, a set of Fruticose Rubi; from Mr. R. M. Stark, Mosses, Hepaticæ, and Algæ; rare English plants, collected by Mr. Wm. M'Ivor, from Professor Balfour; and rare Irish from Mr. David Moore, Dublin. There was also presented a complete set of maps and tabular forms, relative to the arrangement of natural-history collections, mounted on pasteboard, by Mr. W. Brand.

The following communications were read:—

1. On Fairy Rings, by Dr. George Wilson. The object of Dr. Wilson's remarks was to show that the chemical theory of the origin of these remarkable circles, laid before the meeting of the British Association, held at Southampton in September 1846, by Professor Way, of Cirencester College, was identical with that published by Wollaston in the Philosophical Transactions for 1807. Dr. Wilson also pointed out that analyses of various Fungi had been made by Prof. Schlossberger, of Tubingen, and Dr. Doepping, long before Mr. Way published his, and thought that these gentlemen's names deserved to be mentioned, as confirmers of Wollaston's views and predecessors of Professor Way, in establishing the probability of the chemical theory

of Fairy Rings proving true. To Professor Way, on the other hand, belonged the twofold merit of being the first to analyse Agarics actually taken from Fairy Rings, and the first to supply a detailed qualitative, and quantitative analysis of the ashes of these Fungi.

Dr. Balfour made remarks on the views of botanists relative to centrifugal development, and endeavoured to show that a combination of the botanical and chemical theories was necessary to account for the phenomenon of Fairy Rings.

Dr. Fleming thought that none of the theories were sufficient to account for the so-called Fairy Rings in all cases; and alluded to the occurrence of Fungi, especially *Agaricus oreades*, in a circular arrangement without any alteration in the grass.

Sir Wm. Jardine agreed with Dr. Fleming; and stated that the growth of Fungi in lawns was often not in a circular manner, but of various forms, and without altering the appearance of the grass. He then briefly noticed the points which still required determination, and urged upon botanists the importance of attending to them.

2. Supplement to 'A Synopsis of British Rubi, No. 2, by Charles C. Babington, M.A.' In this supplement, Mr. Babington described *Rubus Grabouskii* (*Weihe* ?); *R. nitidus*, var. *rotundifolius*, Bloxam's M.SS.; *R. discolor*, vars. *thyrsoides*, *macro-acanthus* and *argenteus*, of Bell Salter; *R. Balfourianus* of Bloxam; *R. rudis* var. *denticulatus*, Bab.; and *R. fusco-ater* var. *subglaber*, Bab. Specimens from those presented by Dr. Bell Salter, and from Bloxam's fasciculus, were exhibited.

Professor Alphonse De Candolle, director of the Botanic Garden, Geneva, was elected an honorary foreign member; Dr. F. Marius Barneoud, Paris, a foreign member; and C. H. J. Smith, Esq., 41, Queen Street, and Andrew Risk, Esq., 11, Broughton-place, were admitted fellows of the Society.—*W. W. E.*

BOTANICAL SOCIETY OF LONDON.

5th February, 1847.—John Reynolds, Esq., Treasurer, in the chair. Seven new members were elected.

British plants had been received from the Rev. G. E. Smith, Mr. Edwin Lees, Mr. F. Douglas and Miss Beever. Dr. Southby presented numerous Pyrenean specimens. Donations to the library were announced from Mr. A. Gerard, Mr. G. Rich and Mr. F. Crisp. Va-

rious specimens were exhibited, among which the following were included:—

Glyceria hybrida (*Towns.*), from Dovedale, Gloucestershire; communicated by Mr. F. Townsend. A plant very nearly allied to *G. fluitans* and *G. plicata*.

Linaria supina (*Desf.*), from Catsdown Quarries, near Plymouth; communicated by Mr. Goulding. This is a species of South Europe and North Africa, and may have been introduced by shipping.

Arundo lapponica (*Wahl. ?*), from Oakmere, Cheshire; communicated by the Rev. G. E. Smith. The hairs are shorter than the paleæ; but this may be attributed to the early age of the specimen.

Cēnanthæ peucedanifolia (*Sm.*—not *Poll.*), from the neighbourhood of Godalming, Surrey; communicated by Mr. J. D. Salmon. The specimens exhibited had been selected for the Society's Herbarium, in illustration of two characters; first, the cylindrical form of the fruit, much more like that of the Linnean *Cē. pimpinelloides*, than that of the *Cē. Lachenalii* (Smith's *pimpinelloides*); and secondly, as showing the variations in the thickness of the root-tubercles, which in one specimen were thinner than they are frequently seen in *Cē. Lachenalii*.

Festuca pratensis (*Huds.*), from the Isle of Wight; communicated by Mr. H. C. Watson. Another series of specimens, additional to those in the Society's Herbarium, from other localities, illustrating a clear transition from *F. pratensis* into *F. loliacea*.

Mr. James Rich communicated a paper, being a Botanical Ramble in the vicinity of Barcelona, in 1846.

The *Carex* exhibited by Mr. Westcombe (*Phytol.* ii. 751.) was found by him, on a common near Malvern, Worcestershire, in September last.—*G. E. D.*

On the growth of Ferns from seed. By JOSEPH SIDEBOTHAM, Esq.

THE following easy plan of preserving living plants of ferns, was pointed out to me upwards of three years ago, by my friend Mr. Wilson, of Warrington; and I cannot better recommend it to the attention of your readers, than by mentioning the following species, of which I have fine plants, obtained by this process: *Asplenium septentrionale*, *A. viride*, *Ceterach officinarum*, *Polystichum*, *Lonchitis* and *Lastræa rigida*.

Half fill a flower-pot with sifted river sand, and having made the surface very level, scatter a few sporules on it, placing small labels to mark the spot where each species is sown; cement a glass over the

top, and keep the sand moist. By this plan any botanist may obtain roots of his favourite ferns, referring to his herbarium for a few sporules, which can always be procured without damaging the specimens. I prepared two pots of various species, one was accidentally broken, and the produce of the other I mentioned above.

When the plants are sufficiently grown, they may be removed either to a Ward's case, or planted in a pot and covered with a bell glass.

JOSEPH SIDEBOTHAM.

Manchester, February 5th, 1847.

Notes on some British Specimens distributed by the Botanical Society of London, in 1847. By HEWETT C. WATSON, Esq.

IN early Nos. of the 'Phytologist' for 1845 and 1846, the Editor did me the favour to print some explanations respecting certain specimens distributed in those years, by the Botanical Society of London. The object of the notes was to convey such information and suggestions as, it was conceived, might be acceptable to members of the Society, and which could not be communicated to them on the labels of the specimens. I propose again to take a similar course, and to offer some explanations and remarks in reference to certain of the specimens which are now being distributed. As the London Society counts two hundred members (Englishmen, not foreigners), amongst whom are included many of the best practical botanists of the country, and is also in friendly communication with several others who have not yet become members, there can be no doubt that many readers of the 'Phytologist' are comprehended among those botanists who receive specimens from London.

1. *Filago apiculata* (G. E. Sm.). — The Rev. G. E. Smith kindly supplied specimens of this recently described *Filago* (Phytol. ii. p. 575), which will afford to several members the opportunity of becoming acquainted with the plant, and may thus induce them to search for it in other parts of the country. There is good judgment, too, and evidence of scientific good faith, in thus giving to others the means of trying the validity of the characters which are proposed for specific diagnosis, — qualities, unfortunately, which have not been evinced by some other botanists who have described new British species, but who have also sedulously avoided letting specimens thereof be seen by such of their fellow-botanists as were most likely to inquire into the value or validity of their supposed species. Those who receive examples of *Filago apiculata*, of which the supply will

only allow one each to one-tenth of the members, will instantly see its affinity with the common *F. Germanica* (*Gnaphalium*, of the London Catalogue) to be so close that most botanists would assign it thereto, on first glance, and scarce notice it as a variety. The characters by which Mr. Smith would distinguish it are clearly given in a former No. of the 'Phytologist' (l. c.) and need not be repeated here. Of those characters I think I may say, that the greener colour of the leaves, and the purple points of the scales, are the only two which constantly distinguish these examples of *F. apiculata* from those of *F. Germanica* in my own herbarium; and how far the want of the brighter tints may be connected with the age of the older specimens I am not prepared to say. The flexuose growth of the stem, and the apparently lateral position of the heads of flowers, are essentially only a single character; and this character arises from the development of a branch in the axil of only one leaf underneath the head, instead of the two or three branches, from as many leaves, which are usually produced in *F. Germanica*. I take it that the heads terminate the stems strictly and equally in both plants; the difference being only in the number of branches developed underneath them: and therefore, that any ordinary example of *F. Germanica* might so far be converted into the resemblance of *F. apiculata*, by stripping away the second branches from under the successively produced heads as the plant grows upwards. We have an instance in which terminal heads thus become *apparently* lateral in the *Centaurea Calcitrapa*. Though characters which thus result from abortion or simple non-development, are always to be received cautiously, yet, if constant in themselves, and constantly accompanied by other differences, they may fairly enough be adopted in diagnosis. I fear that such constancy will not be found in the case of these two plants. Some of Mr. Smith's own examples of *F. apiculata* are once and twice dichotomously branched below the terminal heads, after the mode which is ordinarily seen in *F. Germanica*; and, on the other side, there are specimens in my herbarium which are veritable *F. Germanica* in all respects, except that they present the spuriously lateral position of the heads, by the non-development of the second branch. One of these, a French specimen, has the flexuose stem and spuriously lateral heads as perfectly and conspicuously as any of Mr. Smith's Yorkshire specimens; but in the gray colour of the plant, its woolly pubescence, narrow leaves, and yellow-pointed scales, it is a true *F. Germanica*. On the contrary, I have an Azoric specimen, which in its ramification is *F. germanica* to the superlative degree,

but which has leaves equally broad as the broadest of those in the Yorkshire specimens, and as clearly apiculate. Of the seeds I can say nothing either way. It may be that I am somewhat too conservative of old species in their undivided integrity; but I think that so careful and accurate an observer, as is the author of the 'Plants of South Kent,' will allow that where characters are thus found to interchange between two very closely allied *quasi*-species, we do rightly to pause before adopting their permanent division. Individually, at least, I must await the opportunity of examining a larger series of both, from different localities, before I can venture to decide either for or against the validity of *F. apiculata*, as a genuine species disconnected from *F. Germanica*.

2. *Epilobium lanceolatum* (Sebast.)—Of this still unsettled species Mr. Thwaites has sent a large supply of specimens from the neighbourhood of Bristol, full length examples, admirably dried. And some good examples were also communicated by Mr. Stephens. The specimens are distinguishable into two trifling varieties or states of luxuriance, gradually passing into each other; the one being smaller, with firmer and much shorter leaves, of a glaucous or grayish colour, tinged with purple; the other being more luxuriant (two or three of the specimens near a yard long, but folded to a length convenient for paper), with longer leaves, which are very thin and flexible in their dried state, and of a bright green colour. The smaller and more rigid examples correspond very well with a specimen from Heidelberg, for which my herbarium was indebted to Mr. Shuttleworth, of Berne. This specimen is labelled, with the note of certainty, "*Epilobium sylvestre*, Dierbach!" By Steudel and others, Dierbach's *E. sylvestre* is cited as a synonym of Sebastiani's *E. lanceolatum*. I have likewise a specimen from Aschersleben, received from an excellent Prussian botanist, Herr Hornung, which corresponds pretty well with the more flexible and greener-leaved examples from Bristol. This specimen is labelled by Hornung "*Epilobium montanum v. lanceolatum*, M. et K." These authorities, in connexion with corroborative information given to me by Mr. Thwaites, are sufficient to satisfy me on the correctness of the name, under which the specimens are labelled by Mr. Thwaites and Mr. Stephens. But the question whether the plant itself should be regarded as a distinct species, or simply as a variety of *Epilobium montanum*, remains to be answered. Having been sown in my garden, some few years ago, from a source which I cannot now distinctly make out, the plant has become quite an established weed there. Among many examples

sown in different parts of the garden by winds or other agencies, both in sunny and in shady situations, none have shown any greater tendency to assume the characters of *E. montanum*, than that of the less luxuriant plants producing shorter and broader leaves; but these leaves are even more petiolated than the wild examples from Bristol, and always taper to their petioles. Notwithstanding this, however, I find considerable difficulty or uncertainty in fairly assigning the specimens in my herbarium between *E. montanum*, *lanceolatum*, and *roseum*; for some examples of each of the former two approximate to others presumed to belong to the latter very obscure species. Perhaps some of the members who may receive specimens, will look out for the *E. lanceolatum* in their own beats, as well as for connecting links between this and *E. montanum*. The chief difference between them is in their leaves, although the smaller flowers of *E. lanceolatum*, and some minor characters, may be taken into account. But the analogy of other species shows that the leaves of the *Epilobia* are very variable, in comparative length and breadth, in the form of their base, and in their insertion.

3. *Euphorbia stricta* ("Reich.") — Specimens from the neighbourhood of Tintern, were supplied by Mr. Thwaites, and (unless I misremember, by some confusion with the preceding plant) also by Mr. Stephens. This plant has been partially and insufficiently known to English botanists for several years. It is alluded to, under *E. platyphylla*, in the fifth edition of the British Flora, as follows: — "A plant, according with Reichenbach's figure of '*E. stricta*,' and differing by its narrower leaves from the common *E. platyphylla* (*E. stricta* Sm.), occurs between Tintern and the Wind-cliff. It is at least a strongly marked var.: *Borrer*." Unfortunately, the specimens have lost most of their stem leaves; but some of them are in good state for showing the better character of difference afforded by the fruit, which, in the Tintern plant, is only half the size of that on the ordinary corn-field *E. stricta* or *platyphylla*, and has the "warts" so prominent as rather to be designated by the term "muricated" than "verrucose." Mr. Kippist has had the Tintern plant under consideration some time, and I must agree with that gentleman in thinking it likely to prove a distinct species from our corn-field plant. The latter, in its luxuriant forms, is called "*platyphylla*;" and in its more starved or unbranched forms, takes the name of "*stricta*;" and when surviving a mild winter, so as to flower a second season, it becomes the variety "*biennis*" of the London Catalogue, which is so different that I could not feel perfectly satisfied in considering it identical with the *E. stricta* of 'Eng-

lish Botany,' until I had proved its specific identity by raising it from seeds. Should the Tintern plant prove permanently distinct from the *E. platyphylla* (or *stricta*) of our corn-fields, Reichenbach's name must give place to some other which will more clearly distinguish it from the *E. stricta* of 'English Botany;' unless, indeed, the Tintern plant should prove to be the *E. stricta* of Linneus, which does not appear likely.

4. *Hieracium rigidum* ("Hartm.") — Here again the Society is indebted to Mr. Thwaites for a good supply of specimens, which it has appeared desirable to send out to each member, as far as they will go. Our native *Hieracia* are still very imperfectly understood, and no existing arrangement of names, or descriptions of the species, will fairly stand the test of comparison with the facts in nature. Among others which are not yet well understood by English botanists, is the species intended under the name of *H. rigidum*, in Babington's Manual. The specimens so labelled by Mr. Thwaites correspond passably well with the description given in that work, and may be the *ipsissima* species intended by the name. But they by no means correspond with the Teesdale specimens collected in 1844, by Mess. Gibson and Backhouse, and (if I mistake not) mentioned in the 'Phytologist' as those of *H. rigidum*. At the time of writing this remark, my Nos. of the 'Phytologist' for the three years preceding 1846 are absent from home; and therefore I refer to this work from memory only; but four specimens (not in flower, though with flower-buds visible) which were kindly given to me by Mr. G. S. Gibson, labelled "*Hieracium rigidum*" and "*Hieracium rigidum*, *v. angustifolium*" bear out the remark. These Teesdale specimens, though not fully answering to Babington's description of "*H. inuloides*," correspond better with specimens so labelled by the Scottish botanists, than with the specimens of Mr. Thwaites. My nearest example to the latter, is a specimen from Mr. Tatham, labelled "*Hieracium rigidum*," and located from "Attermire Rocks, Settle." Under these circumstances of doubt, the specimens are sent out to the members, in the hope of eliciting definite information or suggestive remarks upon the species. Is the name of "*H. rigidum*" correct?

5. "*Hieracium subaudum*?" — There are a few specimens of a plant thus interrogatively labelled by the Rev. Andrew Bloxam, who finds them near Twycross, in company with *H. sylvaticum* and *H. boreale*. This can scarcely be the species intended under the name of "*H. subaudum* (*L.*)," in Babington's Manual; for the leaves are less "cordate clasping" at the base, than are those of specimens

usually labelled "*H. boreale*." As with "*H. rigidum*," so also with these;—they are distributed to ask, rather than to give information.

6. *Hieracium sylvaticum* (Sm.)—A few garden specimens of this species are distributed on account of the form under which a second bud is developed in the axillæ of the leaves subtending the flowering branches of the stem. A flowering stem has grown from the crown of the plant, in the usual manner, throwing out lateral branches from each leaf or bract of the stem. These have flowered and seeded; and then, instead of the stem and branches dying away, buds have been formed in the axillæ of the leaves, between the leaf and its axillary branch. These second buds have developed into young plants. I call them young plants, not branches, because they consist of a cluster of leaves, the petioles of which ensheath one another, and the form of which is precisely that of the leaves of seedling plants, or of the early radical leaves, of spring time, upon the older plants. In some of the specimens a fresh, weakly, flowering stem has shot out from the cluster of leaves, precisely like the first flowering stems of small seedling plants; thus completing their resemblance to (or, rather, identity with) young plants. I could dry only few examples, and not all of these so good as might be desired for illustration of the fact indicated. It is one of not very unusual occurrence, I think, but not sufficiently attended to by botanical physiologists. Taken in connexion with other facts, more or less analogous, it points to a general rule; namely, that when a plant is forced by circumstances to renew its growth in a direction, or at a part from which it would not grow any more under ordinary circumstances,—in such case the renewed growth tends to reproduction, instead of continuation of the individual; having the characters of infancy, more than those of maturity. This may not be a clear explanation of my notion to others, but to follow it up farther, now, would lead astray from the present object of my Notes.

7. *Sisyrinchium anceps* (Lam.)—Mr. Lynam has obligingly sent a number of specimens, from the lately discovered locality "near Woodford, Loughrea, County of Galway." Assuming it to be clearly wild there, the explanation how it got thither will be equally difficult with that which is to be given for the occurrence of *Neottia gemmipara*, or *Eriocaulon septangulare*. What transported them from America to Ireland? I take the name for granted, without special search into its accuracy.

8. *Luzula nivea* (De Cand.)—A few good examples from Dr. Dewar, to whom the Society has been obliged for several valuable donations. They are labelled from a "wood at Broomhall, near Dun-

ferline." This discovery is quite unexpected. I should have conjectured the likelihood of *L. albida* being found in Scotland, to be much greater; but the conjecture would have been wrong, it now appears, though in conformity with the distribution of the two species on the Continent. It is to be feared that this pretty *Luzula* will prove only very local with us; as it seems unlikely to be overlooked by any botanist fortunate enough to come upon a locality for the plant, the white flowers of which should make it rather conspicuous.

9. *Carex vulgaris* var. *junceæ* (Fries ?)—This is one of the innumerable varieties of the species which English botanists, by common consent, and for many years, have (it is said) mis-called "*cæspitosa*;" and which, in the fifth edition of the British Flora, in Babington's Manual, and in the London Catalogue, is entered under the name of "*Goodenovii* (Gay)." Among other distinctions, Gay's *Carex Goodenovii* is stated to have its root "creeping, laxly *cæspitose*;" while the *supposed* Linnean *Carex cæspitosa* (Goodenough's *stricta*) is described as "*densely cæspitose*." The specimens now distributed were pulled from tufts as densely *cæspitose* as ever *Carex* was; fifty or a hundred flowering stems growing up closely together from the same root. Yet they are not the Linnean *cæspitosa*, nor the *stricta* of Goodenough. For the suggestion of the name above given to them, I am indebted to Dr. Boott. Wishing to make some further remarks on this and allied species, I will not seek to occupy more space of the *Phytologist* at the present time; but may send a short separate paper upon them hereafter.

10. *Lysimachia Azorica* (Hornem.)—Two varieties, partly wild examples, partly garden-grown in this country. They are distributed to English botanists on account of their close affinity (perhaps, specific identity) with our *L. nemorum*. I wish to distribute the examples among botanists likely to be familiar with the British *L. nemorum*; because these two varieties, taken in connexion with our native plant, afford very decided instances of the uncertainty or inconstancy of characters, such as are usually deemed very sufficient for specific diagnosis. As with the preceding *Carex*, however, I postpone remarks which might prove rather diffuse or lengthy, to a future occasion; and will now simply recommend botanists to preserve the specimens for reference at another time.

11. *Cyperus fuscus* (Linn.)—Mr. Salmon having sent a good supply of this very local plant, from the new (second) locality, announced lately in the *Phytologist* (ii. 609), it was thought that members might find a specimen acceptable, even though their herbaria might already

have examples of the species from the Chelsea locality. It is to be hoped that Mr. Mill will reply to Mr. Salmon's question, whether the Surrey locality is natural or artificial. Unless the *Cyperus* was carried thither from Chelsea, by some botanist desirous of preserving the species to our flora, the station may be very readily admitted as a perfectly natural habitat. And if the Shalford station is genuine, we shall find others, in all probability.

12. *Orobanche amethystea* (Thuil. ?)—Mr. Guilding has supplied the Society with several specimens of this *Orobanche*, lately discovered by the Rev. W. S. Hore, on Treganthe Sands, Whitsand Bay, Cornwall. It was announced in the *Phytologist*, ii. 239.

13. *Linaria supina* (Desf.)—Mr. Guilding also presented specimens of this species (lately discovered at Catsdown Quarries, near Plymouth) for the Society's herbarium; two or three of which may be spared for some of the members who were sufficiently early in sending in their contributions this winter. (As might be anticipated, a great influx of parcels takes place towards the end of each year. About Christmas, these are taken under examination and arrangement; and a very large addition is thus made at once to the duplicate store. The desiderata of those members who have sent in their contributions between Michaelmas and Christmas, are then looked out in rotation, according to the goodness of their contributions. It thus happens, that members who send their parcels *after* Christmas, are much less likely to get specimens of those rare or novel species which are obtained only in small quantity.—*Verbum sap.*)

Besides the less known plants which I have enumerated, there are various others which will still be desiderata with several members. For instance, a most liberal supply of *Carduus setosus*, given by Dr. Dewar;—numerous good examples of *Galium Vaillantii*, sent by Mr. G. S. Gibson;—good examples of *Glyceria plicata*, from Mr. Moore and Mr. Bentall;—well-dried specimens of *Enanthe silaifolia*, from Mr. Salmon;—excellent examples of *Isatis tinctoria*, from the same member;—a further supply of Irish *Saxifrages*, from Mr. Andrews;—various *Rubi*, from Mr. Bentall and Mr. Lees, some of them considered new species (that is, not included in the London Catalogue). But it is unnecessary to make out a long list here; the members who want the specimens, will find their desiderata lists not made in vain.

Cultivated or Foreign specimens of *Xanthium Strumarium*, *Ajuga pyramidalis*, and other species, (of which the Society has never received British specimens) have been added to the duplicate store, as temporary representatives of the species, better than none at all,

until examples of British growth can be procured to replace them, in the herbaria of members.

Lastly, I will trespass still a few lines more, to recommend the members who may have received only bad specimens, to keep marking the species as a desideratum, until they obtain others sufficiently good. For a series of years, any sort of rubbish, paltry fragments, wretchedly dried, used to be sent to the London Society; and these were most unwisely accepted, and distributed from the Society, as botanical specimens. The improvement during the past three years has been very great, though partial. Many specimens, even this winter, must be destroyed or returned to the contributors. But there are also very numerous specimens so perfect and well-dried, that I can now truly say, for the first time, we have English parcels nowise inferior to the best of the Continental parcels, as respects the condition of the specimens. The names on the labels will show to which of the contributors the credit of this improvement is fairly due; and it might seem obtrusive and invidious were I to mention their names myself. Continental botanists have long made it matter of reproach against those of Britain, that they collect fragments for specimens, and dry them as badly as possible. We are improving, at last; and much of the improvement has sprung from the Bedford Street stimulus.

H. C. WATSON.

Thames Ditton, February, 1847.

Analysis of "an Attempt to arrange the Carices of Middle Europe.

By JOSEPH WOODS, Esq., F.L.S."

THE following analysis of Mr. Woods' valuable paper appears in the 'Linnean Transactions,' (vol. xix. p. 499). I have taken the liberty of giving a nearly literal translation of the characters of the groups; and trust that in its present form it may be acceptable to some of the readers of the 'Phytologist.'

"Mr. Woods passes in review the principal characters by means of which the species of Carices may be arranged into groups, and adopts with some modifications the system of Koch. His arrangement is as follows." The *British* species are printed in *Italics*.

A. Spike single, simple.

1. Diœcious; stigmas 2.

1. *C. dioica*. 2. *C. Davalliana*.

2. Monœcious ; stigmas 2.
 3. *C. pulicaris*. 4. *C. decipiens*. 5. *C. capitata*. 6. *C. Suteri*, which may belong to the following division, as the number of stigmas is not indicated.
3. Monœcious ; stigmas 3.
 7. *C. microglochin*. 8. *C. pauciflora*. 9. *C. Pyrenaica*. 10. *C. spicata*. 11. *C. rupestris*.
 - B. Spikes capitate, involucrate.
 12. *C. cyperoides*. 13. *C. Baldensis*.
 - C. Spikes compound.
 1. Stigmas 3.
 14. *C. curvula*.
 2. Stigmas 2 ; sterile flowers at the apex of the spikes.
 15. *C. fœtida*. 16. *C. stenophylla*. 17. *C. lobata*. 18. *C. incurva*. 19. *C. schœnoides*. 20. *C. divisa*. 21. *C. chordorrhiza*. 22. *C. vulpina*. 23. *C. muricata*. 24. *C. divulsa*. 25. *C. teretiuscula*. 26. *C. paradoxa*. 27. *C. paniculata*.
 3. Stigmas 2 ; some of the spikes fertile, others sterile, or with sterile flowers in the middle of the spike, or with the sterile flowers at the base of some spiculæ, at the apex of others.
 28. *C. ludibunda*. 29. *C. intermedia*. 30. *C. modesta*. 31. *C. arenaria*. 32. *C. repens*. 33. *C. microstyla*.
 4. Stigmas 2 ; sterile flowers at the base of the spikes.
 34. *C. brizoides*. 35. *C. Schreberi*. 36. *C. Ligerica*, (*Gay*). 37. *C. stellulata*. 38. *C. grypos*. 39. *C. ovalis*. 40. *C. axillaris*. 41. *C. Bœnninghausiana*. 42. *C. remota*. 43. *C. elongata*. 44. *C. lagopina*. 45. *C. heleonastes*. 46. *C. curta*. 47. *C. loliacea*.
 - D. Spikes distinct, all androgynous ; sterile flowers at the apex of the spikes ; stigmas 3.
 48. *C. Linkii*. 49. *C. Sarda*.
 - E. Lateral spikes fertile, terminal androgynous, with the sterile flowers at the apex ; stigmas 3, (except in *C. bicolor*) ; fruit with an inconspicuous beak.
 50. *C. bicolor*. 51. *C. atrata*. 52. *C. aterrima*. 53. *C. nigra*. 54. *C. Vahlîi*. 55. *C. Buxbaumii*.
 - F. Spikes distinct ; stigmas 2.
 1. Beak of the fruit complanate, marginate.
 56. *C. mucronata*. 57. *C. microstachya*.
 2. Beak of the fruit small, roundish, generally membranaceous.

58. *C. Grahami*. 59. *C. saxatilis*. 60. *C. Goodenovii*. 61. *C. rigida*. 62. *C. caespitosa*. 63. *C. trinervis*. 64. *C. aquatilis*. 65. *C. acuta*. 66. *C. Moenchiana*.

G. Male spike single, female one or more ; stigmas 3.

1. All or the greater part of the spikes at the apex of the culm, approximate, subsessile ; beak of the fruit not complanate or bifid.

67. *C. supina*. 68. *C. platystachya*. 69. *C. macrolepis*. 70. *C. gynobasis*. 71. *C. Grioletti*. 72. *C. tomentosa*. 73. *C. præcox*. 74. *C. mollis*. 75. *C. reflexa*. 76. *C. umbrosa*. 77. *C. pilulifera*. 78. *C. montana*. 79. *C. ericetorum*.

2. All or the greater part of the spikes at the apex of the culm, approximate, subcorymbose, females pedunculated, nearly equal to the male ; fruit smooth, with a small membranaceous beak or none.

80. *C. rariflora*. 81. *C. limosa*. 82. *C. irrigua*. 83. *C. pallescens*. 84. *C. ustulata*. 85. *C. capillaris*. 86. *C. nitida*. 87. *C. alba*.

3. Characters as in G. 2 ; but with pubescent fruit.

88. *C. digitata*. 89. *C. ornithopoda*.

4. Spikes cylindrical, very dense, corymbose ; beak of the fruit stout, deeply bifid.

90. *C. pseudo-cyperus*.

5. Spikes at the apex of the culm, racemose, the uppermost sessile, the rest pedunculated, peduncles exserted ; beak of the fruit bidentate with a scabrous margin.

91. *C. fuliginosa*. 92. *C. frigida*.

6. Greater part of the spikes at the apex of the culm sessile, or shortly pedunculated, peduncles included ; fruit smooth except at the margin, beak complanate, bifid.

93. *C. extensa*. 94. *C. flava*. 95. *C. Mairii*. 96. *C. Aederi*.

7. Spikes racemose descending down the culm, upper ones sessile or shortly pedunculated, peduncles included, lower ones pedunculated, peduncles somewhat exserted ; beak of the fruit complanate bidentate.

97. *C. Hostiana*. 98. *C. fulva*. 99. *C. Hornschuchiana*. 100. *C. binervis*. 101. *C. laevigata*. 102. *C. distans*. 103. *C. punctata*. 104. *C. Michellii*. 105. *C. brevicollis*. 106. *C. depauperata*. 107. *C. sylvatica*. 108. *C. tenuis*.

8. Characters as in G. 7 ; but the beak of the fruit doubtful.

109. *C. ferruginea*. 110. *C. geniculata*. 111. *C. brevifolia*.

112. *C. spadicea*. 113. *C. sempervirens*. 114. *C. firma*.
 115. *C. refracta*. 116. *C. fimbriata*.
 9. Spikes racemose ; fruit pubescent.
 117. *C. clandestina*.
 10. Spikes loosely racemose ; beak of the fruit roundish, short, or
 membranaceous, or none.
 118. *C. panicea*. 119. *C. vaginata*. 120. *C. pilosa*. 121. *C.*
strigosa.
 11. Spikes long, dense, pendulous.
 122. *C. pendula*. 123. *C. microcarpa*.
 H. Male spikes numerous ; stigmas 3.
 1. Fruit scarcely beaked, sometimes scabrous above, but not every-
 where pubescent.
 124. *C. glauca*. 125. *C. claviformis*. 126. *C. Genuensis*. 127.
C. lasiochlæna. 128. *C. lanceolata*. 129. *C. acuminata*. 130.
C. longiaristata. 131. *C. hispida*.
 2. Fruit very hairy ; beak bifid.
 132. *C. filiformis*. 133. *C. evoluta*. 134. *C. hirta*.
 3. Fruit not hairy ; beak bifid.
 135. *C. secalina*. 136. *C. hordeiformis*. 137. *C. vesicaria*.
 138. *C. ampullacea*. 139. *C. riparia*. 140. *C. Soleirolii*.
 141. *C. nutans*. 142. *C. paludosa*.

"On many of these species, and on other named species which Mr. Woods regards merely as varieties of one or other of the foregoing, the paper contains numerous observations. Of the following species the descriptions are not sufficiently complete to allow of the author placing them : *C. alopecurus*, *Lap.* ; *C. juncoïdes*, *Presl* ; *C. costata*, *Presl* ; *C. furcata*, *Lap.* ; *C. manostachys*, *Spr.* ; *C. fusca*, *All.* ; *C. nesliaca*, *Suter* ; *C. Bastardiana*, *De C.* ; and *C. badia*, *Pers.*"

G. L.

Note on the New Locality for Cyperus fuscus.

By GEORGE G. MILL, Esq.

In announcing his discovery of the rare *Cyperus fuscus* on Shalford Common, near Guildford, Surrey (Phytol. ii. 609), Mr. Salmon is naturally anxious to know whether the habitat is a genuine one, or whether the plant has only been naturalized in that spot by some botanist, desirous, like myself, that it should not be lost to the Flora

of Britain. I am happy to say that so far as I am concerned, the new locality is perfectly genuine.

It would only be right that those who naturalize rare plants, should give publicity to the fact; and should I ever do so, I shall not fail to make the readers of the 'Phytologist' acquainted with the particulars.

GEORGE G. MILL.

Kensington, Feb. 1847.

*Report of Mr. Hinck's paper "On the causes of disjunctions of Vegetable Substance, especially those which are horizontal."**

"AFTER some preliminary observations on the subject of disruptions in general, the author briefly notices certain cases of vertical disruption, and then proceeds to the more immediate object of his paper, the horizontal separation of vegetable substance by natural means. This, he observes, may take place in the axis itself, or in any of the organs connected with it at their points of attachment, as in the fall of the leaf, of sepals and petals, of entire flowers and fruits, and in the separation of such buds as form caulinary bulbs; or it may occur at some other part of the organ, a portion separating from the rest, or the whole breaking up into pieces. Every such separation, he argues, must depend on one of the three following causes: 1. on a stoppage of the circulation from ligature; 2. on unequal rapidity of growth of the two parts; or 3. on the confinement within coherent envelopes (which do not admit of extension) of a portion of the axis or of some growing part, so that the force of growth bursts the envelope, carrying off its upper portion. These general rules he then proceeds to apply to the explanation of particular cases.

"Of stems usually termed Articulate, some, such as those of *Kleinia articulata*, have no tendency to disruption at the supposed joint, which is merely the commencement of a new branch. In the misletoe, on the other hand, the author believes that the tendency to divide at the bases of the branchlets may be consequent on the dichotomous structure, which causes a pressure equivalent to a ligature at the point of division.

* Read before the Linnean Society Dec. 16, 1845.

"With respect to the fall of the leaf, he refers to the observations of DeCandolle and Du Petit Thouars, which he does not think sufficient to account for that phenomenon in a multitude of cases, but regrets that he can throw no additional light on the subject. He attributes the separation of the sepals and petals when they are caducous, to the outward pressure occasioned by the more rapid development of the interior circles stopping the circulation of the fluids, and conceives this to be strikingly exemplified in Papaveraceæ, where the growth of the petals within the bud is great and rapid. He notices a specimen of *Eschscholtzia* in which the sepals cohering less firmly than usual, the calyx, instead of being thrown off in the form of a calyptra, remains after the opening of the flower partially adhering; and observes that the ordinary disruption in this genus takes effect, not at the base of the sepals, but at a point above this, where the pressure occasioned by the enlargement of the petals is greatest. He instances also the genus *Eucalyptus*, in which there is a strong coherence of the sepals, and the lower portion of the calyx being strengthened by the adherent torus, the growth of the interior organs supplies the force which separates the part of the coherent sepals above the torus in a solid piece like the cover of a vessel. On the cause of the horizontal separation of a portion of the anthers in the form of valves, which occurs in a few instances, he is not prepared to offer any opinion.

"In the fruit, as in the calyx, the author believes that horizontal disruption arises from the force of cohesion of the parts of the circle, the absence of any of the causes favourable to dehiscence along the midrib of the carpellary leaf, and the operation of some force pressing either from without or from within on one particular line encircling the fruit; and he proceeds to offer explanations of those cases with which he is most familiar. He takes first the circumscissile capsule of *Anagallis*, in which he states that the central free receptacle with the seeds upon it continuing to enlarge in both diameters after the envelope has ceased to grow, and having occupied from the first the entire cavity, it is naturally to be expected, since the chief extension of the interior parts is upwards (the natural direction of growth), while the enlargement of the seeds in the lower half tends to press back the parts of the lower hemisphere, that uniform and regular pressure will resolve a nearly spherical capsule into two equal hemispheres. This remark he applies to *Centunculus* also, but confesses himself at a loss to give any reason why the opening of *Trientalis*, which depends on the same general causes, should be irregular. For the separation of the lid of the capsule in *Hyoscyamus* he accounts by the contraction

and rigidity of the throat of the calyx exercising a gradually increasing pressure around the upper part of the capsule, and thus causing its separation by the first of the general principles laid down.

"The author then proceeds to the case of *Lecythis*, which he thinks is to be explained by the third of his general principles. In illustration of this principle he refers to a monstrosity of the common tulip, described and exhibited by himself some years ago at a meeting of the British Association. In this monstrosity, the upper leaf, being unusually developed, has cohered by its edges so firmly as to imprison the flower, and this constraint occurring at a period when the stalk was increasing in length, and previous to any considerable enlargement of the flower-bud, the force applied was chiefly vertical, and has carried off the upper part of the leaf in the form of a calyptra, leaving the lower part in the shape of a cup, from the centre of which the stem appears to rise. The separation of the lid of the capsule of *Lecythis* he believes to be effected in an analogous manner; the septa which form the two or four cells into which the fruit is divided, meet in a thickened axis, and the outer part of the fruit becoming (partly from its natural texture and partly from the adherence of the torus and calyx) hard, solid, and fully grown, while the axis continues slowly to extend, and thus to press upwards that portion of the capsule which rests upon it, causes that portion first to become slightly prominent, and finally by a strain upon the vessels of that particular part, to fall off in the shape of a lid. In *Couroupita* the pressure is sufficient to mark the surface of the fruit with a prominence, but from the partitions giving way early, and from the abundant juices produced in the interior, there has not been, he conceives, sufficient pressure to occasion disruption. In all the species of *Lecythis*, he observes, the extent of the loose cover corresponds with the extent of the axis, and what remains of the latter continues attached to it.

"As regards lomentaceous fruits in general, the author believes that the intervals between the seeds being sufficient to admit of the sides of the fruit cohering (which is promoted in particular instances by special causes), the swelling of the seeds afterwards stretches the parts over them in a degree which this coherence prevents from being equally distributed, drags the tissue forcibly from the junctures which are fixed points, and thus there being a strain in each direction from the middle line of the juncture, the contraction of drying during the ripening of the fruit effects the separation.

"Finally the author refers to the horizontal separations in the capsules of Mosses, and observes that the separation of the calyptra affords a plain example of the operation of his third principle; but with regard to the nature of the operculum, although he has an hypothesis under consideration, his mind is not yet satisfied. He states his object in the present paper to have been the investigation of the immediate physical causes of certain known effects, but he has not thought this the place even to touch upon their ultimate causes or the ends to accomplish which they are apparently designed, and which adapt them to the position and general structure of the particular plant."—*Proc. Linn. Soc. No. xxviii. p. 273.*

BOTANICAL SOCIETY OF EDINBURGH.

Thursday, February 11th, 1847.—Dr. Greville, President, in the chair.

Letters were read from Professor De Candolle, Geneva, and Marius Barneoud, Paris, announcing donations; and from Capt. Portlock, giving a short account of his horticultural proceedings at Corfu, and suggesting the *Convolvulus Batatas*, or sweet potato, as a substitute for the potato;—the plant has been introduced into Corfu, and apparently with success. Capt. Portlock describes it as an excellent vegetable, being dry and between the potato and parsnip in taste. He noticed having picked *Orchis hircina*, 18 in. high, at Butrinto, opposite Corfu.

The following communications were read:—

1. "On the Defoliation of Trees," by the Rev. Dr. Fleming. After referring to the extremely defective nomenclature connected with the "defoliation of trees," employed in the writings of Lindley, Gray, and others, Dr. F. called the attention of the Society to a classification of the phenomena which he had published in the 'Edinburgh Journal of Science,' by Brewster, for January, 1826, and where leaves are arranged in reference to their duration into three groups—*Folium deciduum*, *Folium annuum*, *Folium perenne*. In the first class the leaves cease to exercise their functions when the buds have been perfected, and fall off in succession before winter; or, when the plant is trained as a hedge, they frequently remain until the evolution of the buds in the following spring. In the second class the leaves outlive the winter, and do not die or fall off, until a number of new leaves have been evolved for the support of the plant in spring or summer.

Such are the bay, laurel, holly and ivy, which are never without *living leaves*, while in the first class such leaves are periodically wanting. In the third class the leaves continue to exercise their functions for several years, as in the firs, an arrangement in part connected with the ripening of the seeds. The author then proceeded to expose the erroneous views of those who maintain that it is only the buds of a tree which are alive, and that its *timber* is dead, and destined to serve merely as a *soil* for the buds on their evolution in spring. He restricted his proofs to the leaves and branches connected with them which live throughout a succession of seasons—to the mode in which buds can be *forced*—and to the individual differences preserved, in the case of fruit trees, between the stock and graft during the whole period of their connexion.

2. "On *Carex saxatilis*, L., and *Carex Grahmi*, Boott.," by Dr. Balfour. In this communication Dr. B. endeavoured to show that intermediate forms exist which seem to connect the two species. He exhibited specimens picked on Ben na Cruichben, near Killin, in 1844, which showed characters partly of the one species and partly of the other;—all gradations are found from the true form of *C. saxatilis*, with its rounded or ovate, dark, erect spikes, and ovate, beaked, emarginate perigynia slightly longer than the scale; to *C. Grahmi* with its oblong-ovate, somewhat nutant spikes, and bifurcate perigynia, twice as long as the scales.

Dr. Balfour exhibited a series of American ferns, contributed by Dr. Gavin Watson, of Philadelphia, among which the following were the most interesting species and varieties: *Cistopteris tenuis* of Schott, a variety of *C. fragilis*, and various intermediate forms—*Polystichum acrostichoides*, some specimens with rounded pinnæ, and others with the pinnæ much divided and deeply serrated: among the latter were several with the fructification extending to the lowest pinnæ;—*Diplazium thelypteroides* of Presl, several with the segments of the pinnæ very acute;—*Lastrea spinulosa*, various forms, including *L. intermedia* of American botanists;—*Lastrea lancastriensis*, a form approaching *L. cristata*, but apparently distinct: in some specimens the frond was alternately pinnate, with the pinnæ approximated, cleft, or slightly pinnatifid, the segments rounded or slightly toothed: in others the pinnæ were deeply pinnatifid, and much toothed, more or less acute; while in a third set the frond was bipinnate. Numerous intermediate forms were exhibited, showing the transition from the one to the other. *Athyrium Filix-fœmina* of Roth; of this fern a complete series was shown, connecting the typical form of the spe-

cies with the various forms to which the names of *irriguum*, *angustatum* and *asplenoides* have been given by some botanists, who regard them as distinct species.

Dr. Greville, who had carefully examined the specimens of the two last-mentioned ferns, was of opinion that *Lastræa lancastriensis* is a good species, and that all the forms of *Athyrium Filix-fœmina* exhibited were referrible to one species.

Dr. Balfour also showed specimens of *Hieracium rigidum*, var. *angustifolium* of Fries, from near Inversnaid, Loch Lomond, *H. prenanthoides*, Habbie's Howe, Pentland Hills, and *Mimulus luteus*, near old reservoir, Pentlands. The last-named plant has now been found in several spots near Edinburgh; also on the banks of the Clyde, near Glasgow; near Largs; in Perthshire, Stirlingshire and Aberdeenshire; near Morpeth, and in South Wales. Dr. B. also mentioned the discovery of *Achillæa tanacetifolia* in England.

The following gentlemen were admitted ordinary fellows of the Society, viz., Dr. Charles Stewart, 7, London Street, William Balfour Baikie, Esq., 14, Pitt Street, and William Wright, Esq., 19, Salisbury Street.—*W. W. E.*

BOTANICAL SOCIETY OF LONDON.

March 5, 1847. — J. E. Gray, Esq., F.R.S., &c., President, in the chair.

Seven new members were elected, and various donations to the library and herbarium were announced.

Among various other specimens exhibited, were examples of the species mentioned in Mr. Watson's "Notes" in the 'Phytologist' for the present month, and also the following:—

Achillea tanacetifolia (All.).—Communicated by Mr. Hardy, its discoverer, from the side of a high, heathy hill, near Ringing Low, five miles north of Sheffield. Undoubtedly an example of that variable species.

Epilobium brachycarpum (Leight.).—A garden specimen, communicated by Mr. Thwaites. Many duplicates were sent by Mr. Thwaites for distribution, and it may hence be worth while to direct attention to the peculiarity which gives additional interest to them. The subdivision of the Linnean species, *E. angustifolium*, into two others, was founded on the long and short fruit, with other charac-

ters; and the two sub-species were accordingly named by their proposers *E. macrocarpum* (*Stephens*) and *E. brachycarpum* (*Leighton*). The former is the common wild form, the latter being the common garden form in Britain. On the specimens of Mr. Thwaites the fruit is generally under an inch in length; but a few of the pods on many of the specimens range from an inch and a half to even two inches in length.

Potentilla rupestris (Linn.). — A specimen communicated by Miss Harvey, with a label to indicate that it was collected on Ben Lawers, by Dr. Greville. It required the authority of a trustworthy botanist, like Dr. Greville, and the exhibition of an actual specimen of the species, to make the locality credible; and even now it is difficult to conceive how so conspicuous a plant could have been overlooked on a hill very frequently visited by the best practical botanists of Britain.

Saxifraga umbrosa (Linn.). — Specimens from "Craig y bairns" and the "Woods near Dunkeld," communicated by Miss Harvey. The leaves of these examples correspond with those of the Yorkshire specimens from Mr. Tatham, in being crenate, and rather obtusely so. Thus, both the Scottish and the English *apparently* wild plants correspond with the examples usually sent from the Pyrenees, and not with the serrated or dentated forms which prevail in Ireland; but it has already been abundantly established that neither form is peculiar to the Pyrenees or to Ireland.

Ēnanthe pimpinelloides (Linn.) and *Ē. Lachenalii* (Gmel.). — Additional examples from Dr. Bromfield and Mr. Fitt, in illustration of the various stages of growth in these two species.

Mr. Munroe communicated a paper "On the Potato Disease." (P. 759) for *Ēnanthæ* read *Ēnanthe*.—*G. E. D.*

Living Heath and Fossil Tree. By JOSEPH SIDEBOTHAM, Esq.

I SEND you the following statement of facts, and leave your readers to draw their own conclusions; for I must confess I never could arrive at any to *my own* satisfaction.

Six or seven years ago I was told that there was a curious fossil tree to be seen in a stone-quarry, at a place called Tintwistle, about fifteen miles from this town, and that there was a living branch growing from it. Being rather curious to see this wonder, I took the first opportunity of visiting the place, having the same friend for my guide. Tintwistle is a small village situated in a wild, romantic valley,

through which the Sheffield railway passes, and the river which waters it is the principal source of the Mersey. In the sides of the hills are numerous quarries for stone, and it was to one of these that I was conducted, which had not been worked for many years.

About ten feet from the ground, lying in a horizontal position, in the face of the quarry, was what appeared to be the trunk of a fossil tree, a few feet in length, and its impression on the rock some distance farther: from the place where the fossil had been broken off grew a branch, eight or ten feet long, with foliage near the rock and at the extremity. I climbed up to the place, and found that the branch sprang from between the fossil tree and the rock, and appeared quite firmly planted. The fossil itself was a mere infiltration of sand filling up the cavity left by some decayed tree: the markings on the rock where the tree had lain were very indefinite. Of the living branch I could make nothing; the foliage was that of a heath, but the size did not favour the idea: I gathered a few sprigs, and sent them to several friends: the Rev. W. A. Leighton sent me word that he considered it to be *Erica arborea*, a species I had never seen. Since then the place has been visited by a number of *pseudo-geologists*, who cut down the branch without remorse, and I feared quite destroyed it, but have lately learned that it has begun to spring again, and that the proprietor of the quarry strictly preserves it from further depredations.

JOSEPH SIDEBOTHAM.

Manchester, February 15th, 1847.

Note on the Death of Mr. Riley, of Papplewick, and on his Collection of Ferns.

THE name of Mr. Riley, of Papplewick, has long been familiar to botanists in this country. Without making any attempt to laud Mr. Riley's botanical attainments, of which I know but little,* I may venture to describe him as an ardent admirer, an assiduous collector, and a most successful cultivator of the beautiful tribe of ferns. I believe that he spared neither trouble nor expense in pursuing this his favourite study.

It is not perhaps so generally known that Mr. Riley died suddenly

* I believe Mr. Riley's published papers are a 'List of Ferns' and a Paper attempting to divide *Cystopteris fragilis* into a number of species.

when on a botanical visit to York, leaving a widow, who is desirous of parting with his extensive collections. I have received no intimation of this lady's intentions as to the mode in which she wishes to dispose of these collections, but a desire to serve her induces me to give the following brief summary of them, supplied me by Mr. Smith, of the Royal Botanic Garden, at Kew, to whom I recommend such of my readers to apply as may have any inclination to become purchasers.

The collections consist of about two thousand specimens, nearly all named and arranged, and have been obtained from the following sources, viz., Cuming, Cunningham, Ralf, Lippold, Siebold, Linden, Sieber, Schomburgh, Stanger, Haenke, Otto, &c. They are contained in neat cases, and arranged as follows:—

1st.—Named and arranged according to Presl and Sprengel, neatly arranged on cartridge paper, not fastened down, contained in 33 portfolios, 21 inches by 13 inches	....	....	....	....	....	1126
2nd.—Unarranged specimens, named	....	....	....	....	....	377
3rd.—Cuming's Philippine-Island ferns, arranged according to J. Smith in Hooker's 'Journal of Botany,' mounted on paper 20½ inches by 13 do., and named, in nine portfolios	....	....	....	....	....	301
4th.—Cuming's duplicates and St. Helena ferns, named	....	....	....	....	....	140
5th.—Unnamed specimens	....	....	....	....	....	250
Total of dried specimens						2194
6th.—A collection of grasses, mosses and corallines						
7th.—A collection of living ferns, amounting to 550 plants belonging to about 250 species						

EDWARD NEWMAN.

Remarks on Cuscuta approximata (Bab.).

By THOMAS BENTALL, Esq.

IN the list of recent additions to the British Flora given in the preface to the 'Phytologist' for 1846, mention is made of *Cuscuta approximata (Bab.)*. It is, I believe, generally known how this plant first found its way into this country, but perhaps the few following particulars may be interesting to some of the readers of the 'Phyto-

logist,' as they serve to corroborate facts previously noticed in one or two of the public journals.

About three years ago I received from a friend a packet of lucerne seed, which had been imported by the East India Company from Afghanistan. It was at a time when our East Anglian agriculturists were much alarmed at the somewhat serious ravages of *Cuscuta Trifolii* amongst their clover crops. Previously, therefore, to sowing the lucerne seed in my garden, which I had intended to do to ascertain its value in an agricultural point of view, I was induced to examine it, and somewhat to my surprise I found it to contain a considerable admixture of what appeared to be seeds of a *Cuscuta*. I immediately set to work in order to try to raise some plants; a portion of the seed was sown in a large flower-pot, and placed in a cucumber frame, and at the same time an additional quantity was sown on a bed in the open air. In both instances the young lucerne plants soon made their appearance, but it was only in the flower-pot that I observed any trace of the *Cuscuta*. Here I was fortunate enough to obtain three young specimens, but the many vicissitudes to which plants of their peculiar and delicate habit are exposed, soon deprived me of two of their number. With the remaining one, however, I was more fortunate; it soon commenced pushing out its stems in all directions, and in a short time destroyed all the lucerne in the pot. It did not at this time exhibit any signs of flowering: I was therefore induced to transfer it, flower-pot and all, to the centre of the bed before-mentioned, in order to furnish it with a sufficient supply of food for its further development. Soon after its being placed in this situation my hopes were well nigh blasted; for suddenly the stems, which had been previously growing vigorously, became shrivelled, and life appeared almost extinct. At first I was at a loss to account for this circumstance, but afterwards found that it was occasioned by the scorching rays of the sun; a succession of damp, cloudy weather soon after ensuing, it reassumed its healthy appearance, and grew with a rapidity truly astonishing.

In the course of time my *Cuscuta* came to maturity; several clusters of flowers were produced, which enabled me at once to see that it was quite distinct both from *C. Epithymum* and *C. trifolii*, both of which, however, it resembled in habit very closely. Fresh specimens were sent to Mr. Babington, who at once pronounced it to be his *C. approximata*.

There appears to be considerable difficulty in getting the seeds of *Cuscutæ* to vegetate; since making the above experiment, I ha-

many times tried to raise plants from seed, but have never again been successful.

THOMAS BENTALL.

Halstead, March, 1847.

Notice of 'Cybele Britannica; or British Plants and their Geographical Relations.' By HEWETT COTTRELL WATSON.'

THE time has been, and the fact is faithfully chronicled in our botanical publications, when the entire energies of the British botanist were devoted to the acquisition of specimens, and the test of merit was the possession of the greatest number of species. So very blindly was this propensity for numerical superiority carried out, and so totally unaccompanied by any competent botanical knowledge, that in the early days of the 'Phytologist' the same plant *very frequently* occurred under two names in the lists then forwarded for publication, *sometimes* under three names, and *once* under *four* names, and the lists sent us for publication were by no means extraordinary instances of ignorance. The two Botanical Societies at that time distributed plants with equal inattention to correct nomenclature, so that blunders became disseminated through the country under the grave and pompous sanction of scientific authority. Indeed, the blundering of the Societies may have exercised an influence in increasing the blundering of writers. As regards Societies, however, a great improvement has taken place, and great care is now taken to see that the plants distributed are correctly named.

There is also another cause for this general carelessness and inaccuracy in many; it is the opprobrium which shallow lecturers endeavour to cast on the "mere species-man." Of all inventions for concealing ignorance, this is, in every respect, the most deceptive and the most baneful: the intimate and perfect knowledge of species is the basis of Natural History; and those men who hide their own ignorance by a subterfuge so flimsy, however they may lecture, however they may write, they can never be worth hearing or reading; for they possess not that foundation of facts on which all available superstructure of conclusions must be based. As a general writer who confines his labours to words of three letters can only find an audience of children, so he who writes on Natural History without a knowledge of species will only be read by babies in the science, who take comfort in finding an author as ignorant as themselves. We know from

experience the fatal effects of this sneering at true knowledge: we have repeatedly heard conceited young men assert, with evident feelings of self-satisfaction, that "they did not study species, they only sought to investigate principles."

In the compilation of his work Mr. Watson has experienced great difficulty in obtaining the required data, from the impossibility of depending on the accuracy of the authors of both printed and written lists: there is scarcely a species (except those of such universal occurrence as not to have been recorded at all) which has not recorded habitats manifestly at variance with all probability; and Mr. Watson's task of sifting the true from the false or doubtful has truly been a most laborious one; yet, in determining geographical distribution this information is the *sine quâ non* of the philosophical botanist.

The connexion of the subjects are thus pointed out by Mr. Watson:—

"Though a knowledge of plants, and a knowledge of their geographical relations, may be deemed two distinct subjects of study, yet they were perhaps never wholly disjoined, and there is now certainly an increasing tendency to bring them into closer connexion. On the one side, indeed, it is impossible to disconnect the two kinds of knowledge. The technical botanist often knows species sufficiently well in the herbarium or the garden, although understanding extremely little about their geographical relations; but the botanical geographer cannot remain unacquainted with species, while investigating their distribution. The latter takes a march forward, beyond the ground of the technical describer, or the student of species; and before he can do so, he must first pass over that ground; tarrying upon it awhile, to make himself acquainted with species, their names and synonymes, and their technical classifications.

"Bearing in mind, then, that the study of geographical relations is an advance onward, which cannot be successfully made, unless a fair knowledge of species has been previously acquired, it becomes easy to explain why the distribution of plants has hitherto attracted only a very small share of attention from the botanists of Britain. The great—the very great majority have never attempted or wished to go beyond the ground first occupied. Whether their attention has been restricted to the comparatively narrow field of British Botany, or whether it has ranged widely over the Flora of the whole earth;—whether it has been directed to favourite groups of plants, or whether it has sought to compass the whole vegetable world; in either of these cases, sufficient mental interest and employment have usually

been found in the study and description of species, or in their systematic classification.

"As this latter kind of knowledge is increased in amount and accuracy, the botanical geographer becomes facilitated in his own studies; and of course his investigations will be most successful with those plants and those countries, which have been most thoroughly examined by the collectors and describers of species.

"Britain and Germany, Sweden and France—countries whose floral productions have been long studied and known—may now be said to have their botanical geographers, as well as their technical describers of plants. And the same department of phytological science is becoming an important feature even in the descriptive Floras of countries, the plants of which are now, for the first time, publishing in distinct and complete Floras; as witness the admirable works on the botany of Russia, of the Canaries, and of the Antarctic Lands,—respectively, by Ledebour, Webb, and Hooker."

For the sake of convenience Mr. Watson has grouped the counties into eighteen provinces, which is in every respect better than the minor political divisions. A list of these provinces is given below.

- "1. PENINSULA.—Cornwall, Devon, Somerset.
2. CHANNEL.—Dorset, Wilts, Isle of Wight, Hants, Sussex.
3. THAMES.—Kent, Surrey, Berks, Oxford, Bucks, Middlesex, Herts, Essex.
4. OUSE.—Suffolk, Norfolk, Cambridge, Bedford, Huntingdon, Northampton.
5. SEVERN.—Gloucester, Worcester, Warwick, Stafford, Salop, Hereford, Monmouth.
6. SOUTH WALES.—Glamorgan, Caermarthen, Pembroke, Cardigan, Brecon, Radnor.
7. NORTH WALES.—Montgomery, Merioneth, Caernarvon, Denbigh, Flint, Anglesea.
8. TRENT.—Leicester, Rutland, Lincoln, Notts, Derby.
9. MERSEY.—Cheshire, Lancashire.
10. HUMBER.—York.
11. TYNE.—Durham, Northumberland.
12. LAKES.—Westmoreland, Cumberland. (Isle of Man).
13. WEST LOWLANDS.—Dumfries, Kirkcudbright, Wigton, Ayr, Lanark, Renfrew.
14. EAST LOWLANDS.—Berwick, Roxburgh, Peebles, Selkirk, Haddington, Edinburgh, Linlithgow.

15. **EAST HIGHLANDS.**—Fife, Kinross, Clackmannan, Stirling, Perth, Forfar, Kincardine, Aberdeen, Banff, Moray, (including Nairn, Elgin, and the north-east of Inverness).
16. **WEST HIGHLANDS.**—Dumbarton, Argyle, Inverness, westward of Loch Erricht. Isles adjacent, from Arran to Skye.
17. **NORTH HIGHLANDS.**—Ross and Cromarty, Sutherland, Caithness.
18. **NORTH ISLES.**—Hebrides, Orkney, Shetland."

"The uses of these 'Provinces' may be shortly recapitulated. First, they afford a method for showing the areas of plants, as facts in nature, independently of all theoretical explanations and reasons. Secondly, they may be taken as a primary step towards a census of the species, in respect of their comparative frequency; those most widely and generally distributed, even in large spaces, being usually also the most common species. With increasing knowledge, the census will probably be founded on counties or smaller sections; though this degree of exactness cannot be perfectly reached at present. Thirdly, so far as it is shown, the distribution of the species will be shown with greater comparative accuracy; because our lists for provinces can be made much more full and accurate, than would be the case with county lists of species, or lists for other smaller sections. Fourthly, much circumlocution and tedious enumeration of names may be avoided, through referring to the distribution of species by few provinces, rather than by many counties. But, fifthly, it is to be remembered that these provinces are only arbitrary sections, adopted for convenience in description and reference, instead of counties. So far as they do correspond with peculiarities in the physical geography of Britain, it is an advantageous circumstance; although such a correspondence is not necessary to their object or use. The divisions next to come under consideration, on the contrary, are natural; inasmuch as they will be traced in correspondence with the actual distribution of plants, and without reference to political or other conventional boundaries."

The author's observations on regions and zones must be studied by every botanist; they possess great interest, and the more as recording, in some instances, records of the author's personal observations: we may, however, caution juvenile botanists against drawing inferences from any casual list of plants they may have observed at certain ele-

variations or in certain regions, for these must of necessity be incomplete. We have noticed several instances, on the Welch mountains, of plants appearing in patches without much uniformity as regards elevation : thus a patch of juniper commences at a great elevation on Glydir, and ascends nearly to the summit ; another patch occurs fifteen hundred feet lower down : a person descending in a direct line from the summit might observe either of these patches, but not both ; and any conclusion drawn from such observation must be in some degree fallacious. *Cnicus heterophyllus* occurs in magnificent patches on these mountains : on some mountains these patches may be a thousand feet above the juniper ; on others, the juniper may have a like superiority in elevation over the *Cnicus*. On the hills about Loch Lomond we observed *Polypodium Dryopteris* ascending to the very summits ; in Ireland the only known locality is the extreme and exposed summit of Knocklayd : in Herefordshire this fern only occurs in warm sheltered woods, scarcely above the sea-level. *Lycopodium Selago* appears quite a mountain plant in North Wales ; in Sussex it rarely occurs above the sea-level. From this conflicting evidence furnished by plants, of local occurrence and limited range, we are not led to undervalue the facts themselves, but we feel little disposed to deduce conclusions from them. Mr. Watson is himself very circumspect in drawing such conclusions, and never ventures on the expression of any which can be characterized as hypothetical.

We now arrive at a most interesting portion of Mr. Watson's work, the distribution of British plants under seven different types : we need make no apology to our readers for transferring the entire description of these to the pages of the 'Phytologist.'

"In addition to their distribution by provinces and climatic zones, there is a third mode of indicating the geographical relations of plants, which may also require some explanation. It has been before observed that certain species are spread over the whole island, while others are limited to one, two, three or more of the provinces. The same holds true in the zones ; some species occurring in all of them, others in one or more. Perhaps no two species have exactly the same distribution or relative frequency ; and yet certain general similarities may be traced, by which the species may be grouped together under a few leading *Types of distribution*. In the small volume before alluded to, by the title of 'Remarks,' certain 'geographic types' were indicated (pp. 86—89) ; and in the 'Tabular Appendix' to the same volume (115—184), the species were severally assigned to their peculiar types. This was simply an attempt to ex-

press, by a single term, the leading character of their distribution, with reference to geographical position and climate. Six types of distribution were particularly mentioned; under one or other of which, it was thought, nearly all the species of plants indigenous in Britain might respectively be arranged. No attempt, however, was made to define the precise limits of the types geographically. Nor, indeed, could any exact boundary lines be traced on a map, without abruptly cutting asunder the fine gradations of Nature; for the types pass into each other without any hard or abrupt lines of distinction. In slightly describing the several types, in the former volume, a different order of succession was adopted, and consequently the nos. affixed to them were different also; but in other respects they were essentially the same as the following:—

The British Type.—In this group will be included those species which are found in all, or nearly all, of the eighteen provinces explained; and which, moreover, are not so exclusively predominant or predominant in any particular portion of the island, as to place them clearly within one or other of the following types. Some species may be regarded as of universal occurrence in this country, growing in all the eighteen provinces, probably in every county, and even in all the six ascending zones of vegetation or climate also. Few species, however, even of this most general type, are so very general in their distribution. By far the larger portion of species have a restricted zonal range. Many, too, which are general in reference to the provinces, are absent from some of the counties. A considerable number of species which are too widely and abundantly distributed to allow of their being placed under any of the other types, are yet rare or wholly wanting in one or more of the provinces; particularly in the northerly provinces of Scotland, and more especially in that of the North Isles, which has a very scanty flora. The species thus characterized by their general presence and prevalence are only in those tracts which are seldom visited by man, some familiarly known and contemned under the designation of "common things;" and being much neglected, in consequence, has often been found difficult to ascertain their true distribution and comparative frequency, on recorded evidence. It is observed that the name of 'British type' is applicable to any hypothetical notions of their origin within the island, and such a general distribution and prevalence independent of the climate and other local conditions of the island entitles them to be considered thoroughly British.

both in England and Scotland—to be Britons in the fullest signification of the term. It is probable that about two-fifths of the whole number of British species (including ‘natives,’ ‘denizens,’ ‘colonists,’ as presently to be explained) will be referred to this, the most general type of distribution; although, at present, the number cannot be exactly stated. Among the more thorough examples of the type may be instanced the following, namely, *Alnus glutinosa*, *Betula alba*, *Corylus Avellana*, *Salix capræa*, *Rosa canina*, *Lonicera Periclymenum*, *Hedera Helix*, *Cytisus scoparius*, *Calluna vulgaris*, *Ranunculus acris*, *Cerastium viscosum*, *Potentilla Tormentilla*, *Trifolium repens*, *Stellaria media*, *Lotus corniculatus*, *Bellis perennis*, *Senecio vulgaris*, *Carduus palustris*, *Taraxacum officinale*, *Myosotis arvensis*, *Prunella vulgaris*, *Plantago lanceolata*, *Polygonum aviculare*, *Urtica dioica*, *Potamogeton natans*, *Lemna minor*, *Juncus effusus*, *Carex panicea*, *Poa annua*, *Festuca ovina*, *Anthoxanthum odoratum*, *Pteris aquilina*, *Polypodium vulgare*, *Lastrea Filix-mas*.

“2. *The English Type*.—The plants of this geographic type are distinguished from those of the British type by having their chief prevalence in England, and particularly in its more southern provinces; whence they gradually become rare in a northern direction, and finally (with few peculiar exceptions) find an earlier northern limit or cessation than those of the preceding type. Their terminal lines are very different among themselves; some of the species being entirely limited to two or three of the most southern provinces of England; while other species occur in all the provinces of Britain, with an exception of two or three of the most northern; the great majority having their limits between these two extremes. Those species which extend into nearly all the provinces, except two or three of the northern, approximate very closely to the less general examples of the British type; and, in fact, there are cases where it becomes almost optional whether the species are to be referred to the one or to the other type. To the characters of diminished frequency and earlier northern termination, which distinguish the species of the English from those of the British type, must be added that of spreading into both the eastern and the western provinces of England, and without any very striking difference of comparative frequency towards the two sides of the island, beyond that which may be caused by the repellent influence of the western mountains, which necessarily tend to banish such species as are naturally adapted to low situation, in a warmer and drier climate than that of our mountainous tracts. The name of ‘English Type’ will not be misunderstood to indicate that

all the species are peculiar to England, but is to be understood only as implying that the species are apparently adapted to the climate of England, either being restricted to that part of Britain, or being more prevalent there than in Scotland. As a temporary estimate, we may reckon the species of the English type at about one-fifth of the whole Flora of Britain. *Cyperus longus* and *Cicendia filiformis* are very local examples of this type, if, indeed, they can be fairly referred to it; being restricted to a few counties southward of the Thames and Bristol Channel. On the other hand, *Malva moschata* and *Poterium Sanguisorba* approximate to the British type in being distributed from the south coast of England up to the middle of Scotland. More characteristic examples of the English type of distribution may be cited in *Rhamnus catharticus*, *Ulex nanus*, *Tamus communis*, *Bryonia dioica*, *Hottonia palustris*, *Chlora perfoliata*, *Sison Amomum*, *Moenchia erecta*, *Linaria Elatine*, *Ranunculus parviflorus*, *Lamium Galeobdolon*, *Hordeum pratense*, *Alopecurus agrestis*, *Ceterach officinarum*.

"3. *The Scottish Type*.—This may be deemed the opposite of the English type; the distribution of the species referred hereto being characterized by a northern tendency, either by absolute limitation to Scotland or the north of England, or otherwise by a chief prevalence there and increased rarity southward. Parallel with some of the species referred to the English type, so some of those referred to this present one are quite restricted to two or three of the most northern provinces of Scotland; while others abound in Scotland, and also spread southward, although in diminished frequency, far down England; others, again, finding their southern limits between the extremes of narrow and wide distribution. With respect to those species which are most widely distributed, their diminished frequency, or entire absence in the southerly provinces, applies more particularly to the south-east of England, where the climate is drier, and the summer temperature is higher than usually experienced in the south-western provinces of England. Along with this group, also, may be associated certain species which run out to diminished frequency, or early absolute cessation, northward as well as southward; occurring chiefly or only in the northern provinces of England and southern provinces of Scotland. Equally with the rest, these are truly plants of a boreal distribution and prevalence, when we consider them with reference to the southern provinces of England; although it may also be said that they are so far species of a southern distribution likewise, when considered with reference to the northern provinces of Scotland. From other species of the Scottish type, however, they differ

chiefly by their more restricted areas; for their tendency to the hilly districts of England and the Lowlands, like those which extend still farther northward in Scotland, indicates a general similarity of climatal adaptation, while it strongly distinguishes them from species of the truly English type. It will thus be understood that several of the species assigned to the Scottish type of distribution are not prevalent only in Scotland; some of them, indeed, being more prevalent in the northern provinces of England. But since the majority are prevalent in Scotland, the name of the type is taken from that northern portion of the kingdom, as a sufficient contrast to the name adopted for the more southern or English type. Perhaps not more than a twentieth of the whole number of British plants will come under the Scottish type. *Primula scotica* and *Ajuga pyramidalis* are instances of an extremely restricted and boreal area. *Goodyera repens* and *Corallorhiza innata* are also very partial, though less thoroughly boreal with us. *Primula farinosa* and *Saxifraga Hirculus* may be instanced as examples of that division of the Scottish group which is characterized by a comparatively early limit northward. But more characteristic examples of the Scottish type may be mentioned in *Empetrum nigrum*, *Rubus saxatilis*, *Trollius europæus*, *Geranium sylvaticum*, *Trientalis europæa*, *Habenaria albida*, *Ligusticum scoticum*, and *Lithospermum maritimum*.

"4. *Highland type*.—This may be considered the boreal flora in a more intense degree, as respects climate, than that of the Scottish type. The species referred hereto are distinguished from those of the Scottish type by being more especially limited to the mountains or their immediate vicinity. Some of them are wholly confined to the higher mountains, and never descend within the agrarian region; these being the 'arctics' before mentioned on page 54. Others, though prevalent on the mountains, do descend also into their glens and valleys quite within the agrarian region. And others, again, may occasionally be seen outside the mountainous tracts, particularly along the course of rivers which have their sources among the mountains, or even upon the rocks of the sea-coast. As a group, these species are either restricted to the mountains or very decidedly more prevalent there. Several of them, more especially the true arctics, are strictly peculiar to the Highland mountains; while others occur also on the mountains of England and Wales, though less plentifully than in the Highlands of Scotland. The name chosen for the type intimates their most appropriate habitat, although some of them do likewise find a suitable climate on the mountains of England or Wales. It is probable that

the Highland type will comprehend about a fifteenth of the whole flora of Britain; its species scarcely reaching a hundred. But if we should unite the Highland and Scottish types, as one boreal type in contrast against the austral or English, they would together constitute about an eighth of the species now fairly wild in Britain. As examples of thoroughly Highland species, such as do not occur in any province southward of the Highlands, we may cite *Azalea procumbens*, *Cherleria sedoides*, *Veronica alpina*, *Alopecurus alpinus*, *Phleum alpinum*, *Juncus trifidus*, *Sibbaldia procumbens*, *Erigeron alpinus*, and *Gentiana nivalis*. And as examples of other species which occur likewise on the more southern mountains, and mostly descend lower on those of the Highland provinces, we may enumerate *Salix herbacea*, *Silene acaulis*, *Saxifraga stellaris*, *Oxyria reniformis*, *Thalictrum alpinum*, *Luzula spicata*, *Juncus triglumis*, *Rubus Chamæmorus*, *Epilobium alsinifolium*, *Draba incana*, *Dryas octopetala*, and *Alchemilla alpina*.

“5. *The Germanic Type*.—The distribution of several species which might otherwise be associated with those of the English type, is peculiarly characterized by a tendency to the eastern side of the island. Some few of these are absolutely restricted to the south-eastern provinces of England,—Channel, Thames, Ouse, one or more; while others of them extend farther northward or westward, yet decidedly diminishing in abundance in either direction. As the cretaceous deposits lie almost solely in the eastern and south-eastern provinces of England, the ‘chalk plants’ are included with the others referred to the present type; although, it is to be recollected, that the type is primarily founded upon botanico-geographical peculiarities, and not upon any geological characters. Some of the eastern species extend even into Scotland; but, for the most part, they are the species of England. The name of ‘Germanic’ type is not applied with reference to any supposed origin from Germany, but simply as indicating the tendency of the species to a distribution connected with those provinces of England which are bounded by the German or North Sea eastward, including the Straits of Dover and upper part of the English Channel; for the species of this present, and those of the next type, more or less intermingle in the counties of the English Channel. The species which can be assigned to this type may run between a fifteenth and a twentieth of those which are reputed to be indigenous in Britain; the number varying according to the degree of decrease westward which may be deemed sufficient to warrant the assignment of species to the present rather than to the English type.

Among the examples of the type may be instanced the following : namely, *Frankenia lævis*, *Anemone Pulsatilla*, *Reseda lutea*, *Silene noctiflora*, *Silene conica*, *Bupleurum tenuissimum*, *Pimpinella magna*, *Pulicaria vulgaris*, *Lactuca Scariola*, *Atriplex pedunculata*, *Aceras anthropophora*, *Ophrys aranifera*, and *Spartina stricta*.

“6. *The Atlantic Type*.—Contrary to the peculiarity of distribution which constitutes the Germanic type, there is in that of other species a marked tendency towards the western and south-western coasts or countries. Some few species are absolutely restricted to the single province of the Peninsula. Others occur also in one or more of the adjacent provinces. And others, again, run far up the western coasts in a northerly direction, often plentifully there, and yet occur very rarely, or not at all, towards the eastern coasts of the island. These species, although thus dissimilar in respect of their area and census, correspond in the one circumstance of having some decided tendency to the western or Atlantic side of the island, in contradistinction to the eastern or Germanic side. Although there may exist other reasons for specially denominating some of these the ‘Atlantic species,’ the name of the type will be here understood as having reference only to their distribution within Britain itself, and by itself. About the same number of species are likely to be referred to this type, as to the Germanic ; its arithmetical value being somewhere between a fifteenth and a twentieth part of the Flora of Britain. As examples, we have *Sinapis monensis*, *Matthiola sinuata*, *Raphanus maritimus*, *Sedum anglicum*, *Cotyledon Umbilicus*, *Bartsia viscosa*, *Pinguicula lusitanica*, *Euphorbia Peplis*, *Euphorbia Portlandica*, *Scirpus Savii*, — which occur in several counties ; also *Sibthorpia europæa*, *Erica vagans*, *Erica ciliaris*, *Physospermum cornubiense*, *Polycarpon tetraphyllum*, *Adiantum Capillus-Veneris*, *Cynodon Dactylon*, and others which occur in very few or only single counties. On pages 9 and 12, *Cynodon Dactylon* is inadvertently said to be found only in Cornwall ; that name having been overlooked in Dr. Salter’s list of plants near Poole, in Dorset : a consequence of its alphabetical series of names, which renders comparisons with scientifically arranged lists so exceedingly troublesome.

“7. *A Local or doubtful Type*.—Interspersed about the island, there are some species whose distribution is restricted to single or few counties. Such species can seldom show that decided tendency to the east or the west, to the south or the north, to the mountains or otherwise, which would fully warrant their assignment to any one of the six preceding types of distribution. In those instances where the

single or few localities occur clearly and solely within the geographic limits of one of the types, the plants will usually be associated with the group to which they thus make the nearest approach. For instance, there can be no hesitation in assigning the extremely local *Lychnis alpina* and *Oxytropis campestris* to the Highland type; and not much more doubt can arise respecting the propriety of placing *Arenaria norvegica* and *Primula scotica* in the Scottish type. So also, the local *Cicendia filiformis* may go to the English type; *Veronica verna*, to the Germanic type; *Erica vagans*, to the Atlantic type. But after thus disposing of a large portion of these local species, there are still some others left on hand, which cannot be so fairly assigned to any of our six principal types. *Potentilla rupestris* and *Anthericum serotinum*, for instance, are peculiar to single mountains in North Wales. As local western species they might be associated with the Atlantic type; but the hilly and inland nature of their localities, and their absence from the provinces of South Wales and the Peninsula, come inconveniently in conflict with the chief characters of the Atlantic type. *Draba aizoides* and *Cotoneaster vulgaris*, found on the rocky coasts of Wales very locally, approximate rather nearer to that type, and might be associated under it, in so far as Britain is concerned; and yet, if we should extend our views, so as to take in their distribution upon the continent of Europe, this would be found a misposition. Some other less local species have also a distribution which does not correspond with that of any of the six types specified; their localities being restricted to calcareous rocks, and occurring in such positions as not to place them properly under one of those types. Examples may be mentioned in *Draba muralis* and *Hutchinsia petræa*, the distribution of which is strictly neither eastern nor western, northern nor southern; and, though they are in some degree hill plants, yet they are certainly not Highland species; while their very limited area separates them as clearly from the British or general type. *Eriocaulon septangulare* is another anomaly, which was associated with some very few other species into the 'Hebridean type' of the former work. But as these few did not make a congruous group, and were numerically too insignificant to be set up against those of the other six types, the Hebridean is here discarded, and its half-dozen species divided between the Scottish and Local types."

In connexion with this subject, we are bound to notice some remarks comprised by Mr. Watson in an Appendix to the present volume. In the 'Phytologist,' we have, on several occasions, thought it nece

sary to mention an hypothesis promulged by Mr. Forbes, at the meeting of the British Association, held at Cambridge, in 1845, and bearing on the distribution of plants in Great Britain: this hypothesis we have always mentioned with disapprobation, considering that the data used in its support were Mr. Watson's and not Mr. Forbes's, and, moreover, that no such conclusions as those advanced by Mr. Forbes were deducible from the data. We now call on our readers to examine dispassionately Mr. Watson's observations, and to judge for themselves: we claim no weight or authority for our own remarks, but wish all our readers to form their own unbiassed judgment: we cannot afford space for the entire Appendix, and will not venture to garble or abbreviate: our readers are referred to the book itself, which all botanists must of necessity peruse, and which, we rejoice to say, has taken the matter entirely out of our jurisdiction. No expression of ours, in regard to Mr. Forbes, has originated in any other motive than the desire to protect a favorite science from the injurious effects of mixing the ideal with the real; and this course we hope to pursue, in all cases, without fear and without favour. The public acts of public men are public property; and it were not merely an act of cowardice, but of dishonesty, to refrain from the candid expression of opinion concerning them.

It now only remains for us to give an example of Mr. Watson's work, and to explain the areas as defined by the author.

" 156. *SILENE NUTANS*, *Linn.*

'*SILENE ITALICA*.'

'*SILENE PATENS*.'

" Area (1) 2 3 [4] 5 * 7 8 * 10 * * * (14) 15 * * [18].

" South limit in Isle of Wight and Kent.

" North limit in Kincardineshire and Flintshire.

" Estimate of provinces 7. Estimate of counties 12.

" Latitude 50—57. Local type of distribution.

" Agrarian region. Inferagrarian—Midagrarian zones.

" Descends nearly to the coast level in England.

" Ascends to 50 or 100 yards, in England.

" Range of mean annual temperature 51—48.

" Native. Rupestral. The distribution of this species cannot be satisfactorily given; partly, because the name has been misapplied, and false localities consequently introduced into books; partly, because it is doubtful where the true species is wild, and where it exists

only as an introduced plant. I have only one locality for the Peninsula; namely, at its northern extremity, on the authority of the Flora Bathoniensis, which questions the true nativity there. Again, somewhat unexpectedly, I find the name marked in a list of Isle of Wight plants, which Dr. Bromfield kindly checked for me, before leaving England; and that being my sole authority for the second province, I should have preferred to ascertain from Dr. B. (now abroad) whether the mark was intentionally or inadvertently affixed to the name of 'nutans:' perhaps it ought to stand so; for Dr. Bromfield rarely is inadvertent in his botanical doings. Next, we have the third province to consider; and here, on the cliffs of Kent, some species certainly does grow; and to which the various names of 'nutans,' 'italica,' 'patens,' and 'paradoxa,' have been applied, in a medley of confusion which I am not just now prepared to unravel. *S. nutans* is reported also from Hertfordshire, by Messrs. Webb and Coleman, 'probably introduced.' For the province of Ouse, a locality has been published 'in the corn, between Harrington and Wakerley,' on authority of Morton's History of Northamptonshire; but this species is not a corn-field plant, and some other was more likely the one seen there. Nobody appears to have confirmed the correctness of the Rev. W. Wood's locality of 'Hawkestone,' in Shropshire, which is the only one in the fifth province, as far as my notes go; but as the *S. nutans* grows in Dovedale, on the Derbyshire side of a narrow stream, it may also grow on the Staffordshire side of the same stream, which will give the species a 'local habitation' just within the county limit of the Severn province; though, in respect of physical geography, that part of Staffordshire belongs of right to the Trent province. The provinces of North Wales and Trent are not disputed. That of Yorkshire requires corroboration; the single locality, 'rocks about Knaresborough,' resting on old and not very safe authority. 'Salisbury Crags,' by Edinburgh, is the locality given with specimens, which are labelled '*S. italica*,' from the Edinburgh Botanical Society; but surely that species must have been sown there, or it would have been earlier discovered by some of the numerous good botanists with which that city is always supplied. The counties of Fife, Forfar and Kincardine, have been several times reported on ample authority. *S. nutans* seems best to associate with the Anglo-Cambrian group of the Local type. Its head-quarters are on the limestones of North Wales and Derbyshire, with several outposts or outlying localities, of which the south-east coast of the East Highlands appears to be the strongest. As to Orkney, it stands only on the faith of Lowe's list, and cannot be

received without additional authority. The stations on the borders of the East Highlands, and perhaps those among the hills of Derbyshire, carry its range almost within the superagrarian zone. I have not so indicated the zonal range, because those northern localities seem quite restricted to the coast line, where the climate is hardly that of the upper zone."

Explanation of the foregoing.

"The first line shows, by their numbers, the provinces within which the species has been ascertained or reported to grow. The uninclosed numbers show those provinces in which it is so far wild or established as to be fairly considered a British species—native, denizen, or colonist, as presently to be explained. The numbers which are enclosed by curves, thus (), will indicate the provinces within which the species can scarcely yet be deemed really wild, although existent there. Those numbers which are enclosed by angles, thus [], will refer to the provinces within which the species has been reported to occur, although under circumstances of doubt which render some confirmation necessary; most of the provinces so distinguished being probably erroneous.

"The second and third lines give the north and south limits of the species in Britain, by naming those counties in which occur their extreme localities. The selection of counties to be cited is made with reference both to the east and the west sides of the island; whereby to convey some idea of the relation of the species to longitude also. Thus, for instance, the county of Glamorgan is named in the north limit of the Clematis; although the other two counties, Salop and Norfolk, are much more northerly. This is done, because, so far as yet ascertained, the county of Glamorgan is the north limit of the Clematis in the longitude of Wales; the alpine character of the two Welch provinces being unfavourable to a shrub which requires a warm summer. Our lists of Cornish plants being yet very incomplete, Devon will be named as the south limit of many species which doubtless do grow also in Cornwall.

"The fourth line is devoted to a sort of census of the species. This can only be given approximately, by estimating the number of provinces and of counties within which the species is deemed likely to occur. It is probable that the number of provinces will be set down correctly for the majority of the species; though there may still remain a considerable minority, for which the number of provinces will ultimately be found less exact. The lists of species for South Wales,

the Lake Province, and the North and West Highlands, are still incompletely made out; and there are several dubious species, whose provincial distribution can be very imperfectly known at present. The number of un-enclosed figures in the first line, in contrast with the number given as the estimate, will show where additions have been made to the latter, on assumed probabilities. For counties, the estimated number will often be given much higher than has been actually ascertained; more especially for the common species, which are seldom noticed, except in local floras and catalogues which profess to include everything. The census for counties is estimated by, first, reckoning up those within which the species has been ascertained to occur; secondly, reckoning those from which it is believed to be absent; and, thirdly, adding the rest to one or other side, according to presumed probabilities. Though much is here assumed, particularly with respect to the distribution of the common species, yet the result of this estimate, it is believed, will come very near the truth; the author's attention having been so long directed to the distribution of plants in Britain, that he can usually guess pretty accurately whether any given species will or will not be found in any given county. Of course, there are some exceptions to the accuracy of such guesses, especially in the cases of confused or neglected species, such as *Enanthe peucedanifolia* or *Ranunculus Lenormandi*. As an example, where much has been assumed without certain knowledge, the census of *Stellaria media* may be cited. On putting together all his local lists, the author cannot show, on authority, that this very common plant grows in so many as sixty counties; but he unhesitatingly assumes it to occur in every county. The whole number of counties is taken at 82; some small counties (Rutland, Kinross, &c.) being sunk into those adjacent, and some isles or groups of isles (Man, Hebrides, &c.) being reckoned as counties of themselves. The intermediate numbers, between 15 and 80, are taken in steps of 5 or 10, since the use of units would there be only an affectation of exactness; and the nature of the test throws the larger proportion of the species towards one or other extreme of the scale. The series of numbers actually used in the census of counties runs thus:—1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 15, 20, 25, 30, 40, 50, 60, 70, 75, 80, 81, 82.

“The fifth line indicates the range of latitude and the geographic type. To show the limits in latitude, those figures are used which correspond with the mathematical lines on maps, between which all the known localities are situate. No fractions of degrees are used. Thus, in marking the range of *Clematis Vitalba*, as 50—53, it is no

intended that localities for the species do certainly occur under the mathematical lines of 50° and 53° , but simply that they occur more southerly than 51° , more northerly than 52° . The native localities of the *Clematis* all occur under the 51st, 52nd, and 53rd degrees; and thus the first lines which indicate whole degrees, south and north of the extreme localities, are those of 50° and 53° . Some little uncertainty will arise occasionally in applying the figures. For example, the parallel of 59° crosses the Orkney Isles, and there are no records adequate to show which of the Orkney species, if any, do not pass to the northward of that line. In this uncertainty, to distinguish those of Orkney from the species which cease in Sutherland or Caithness, all the former are assumed to be bounded northward by the line of 60° . At the other end of Britain, the Cornish species are assumed to be all on the north side of 50° , notwithstanding that the Lizard Point is rather short of that line. Of the Scilly flora, almost nothing is yet known; and hence the parallel of 49° is scarcely used in this work.

"The types of distribution have been explained in former pages of this volume. It may be as well again to remind those who use this work, that such a mode of grouping species, though founded upon fact, can be only a rough view or approximation to nature; many of the species being so intermediate in the character of their distribution, as to render it doubtful, if not optional, to which of the types they should be referred. The first species of the series, the conspicuous *Clematis*, is an example of a doubtful type; while the second one, the easily overlooked *Thalictrum alpinum*, is an unquestionable example of the Highland type.

"The sixth line gives the region or regions, and the zonal range of the species. The regions and zones have also been explained in former pages. In the case of species which occur in both the Arctic and Agrarian zones, an abbreviation is made into the two initial letters 'A. A.' The zonal range is indicated by naming the highest and lowest zones inhabited, by the species, if growing in more than one of them, as is more usually the case.

"The seventh line is intended to show the lowest ascertained limit of the species. Comparatively few British species are wholly restricted to localities much above the level of the shores. Hence, for the greater number, the lower limits are indicated with reference to the most southerly provinces within which they descend nearly or quite to the sea level. The expression 'coast level' is not to be construed as meaning the actual level of the tides, but simply low situations not much above the sea. For species which do not descend to the coast

level in any part of Britain, the lowest altitude is indicated by yards, and usually reckoned by steps of 50 yards.

"The eighth line shows the highest limit ascertained for the species, also by steps of 50 yards, without affecting more minute exactness. There are many plants of the plains or low grounds, not ascending the mountains, the upper limits of which can only be guessed in general terms. Thus, for example, the true upper limits of the *Clematis*, *Euonymus*, *Tamus*, &c., not having been exactly ascertained, they will be indicated in general terms, at 100 or 200 yards.

"The ninth line is intended to show the range of mean annual temperature under which the species grows in Britain. It will easily be understood that this cannot be more than an approximation to the true climate. The estimate is made in the following manner. The mean annual temperature of the air (that of the ground being nearly the same), on the south-west coast of England, is taken at 52° of Fahrenheit's scale; that of the south-east coast, at 51°; the estuaries of the Thames and Severn, at 50°; those of the Humber and Mersey, at 49°; those of the Forth and Clyde, at 48°; the extremities of the Caledonian Canal, at 47°; the north coast of Scotland, at 46°. One degree is deducted from inland localities under the same latitude, and one degree also for each hundred yards of elevation above the level of the sea. In applying this rule to particular species, however, some slight allowance has been made for situation. It is probable that the temperature of the atmosphere, with us, decreases more rapidly than one degree for one hundred yards of elevation, while that of the earth decreases less rapidly. On the Highland mountains, between 3000 and 4000 feet, the temperature of springs varies but little with altitude, during the summer months; being usually 37° or 38°, where the exit of the water is unimpeded by vegetation.

"The tenth line, continued into a paragraph, is intended to show the civil claims and local situation of the species, in accordance with a scale of terms; also to give any other brief notices which may seem desirable or necessary. The first word is one taken from the following series of terms, used to express the civil claims of the species:—

- "1. Native.—Apparently an aboriginal British species; there being little or no reason for supposing it to have been introduced by human agency. Examples: *Corylus*, *Calluna*, *Bellis*, *Teesdalia*.
- "2. Denizen.—At present maintaining its habitats, as if a native, without the aid of man, yet liable to some sus-

picion of having been originally introduced. Examples: *Aconitum*, *Pæonia*, *Viola odorata*, *Impatiens Noli-me-tangere*.

3. Colonist.—A weed of cultivated land or about houses, and seldom found except in places where the ground has been adapted for its production by the operations of man; with some tendency, however, to appear also on the shores, landslips, &c. Examples: *Adonis*, *Papaver*, *Agrostemma*, *Melilotus leucantha*.

“ 4. Alien.—Now more or less established, but either presumed or certainly known to have been originally introduced from other countries. Examples: *Sempervivum*, *Mimulus*, *Hesperis*, *Camelina*.

“ 5. Incognita.—Reported as British, but requiring confirmation as such. Some of these have been reported through mistakes of the species, as *Ranunculus gramineus*. Others may have been really seen in the character of temporary stragglers from gardens, as *Gentiana acaulis*. Others cannot now be found in the localities published for them, as *Tussilago alpina* and other species, reported by or from Mr. George Don; though it is not improbable that some of these may yet be found again. A few may have existed for a time, and become extinct, as *Echinophora spinosa*.

“ 6. Hibernian, or Sarnian.—Native, or apparently so, in Ireland, or in the Channel Isles, though not found in Britain proper.”

These long and explanatory quotations will give the reader a better idea of Mr. Watson's work than any description of ours. The present is a first volume, and contains the author's observations on 503 species, beginning with the *Ranunculaceæ* and ending with the *Umbelliferæ*. We have only to add, that we wish it that success which the labour bestowed on it most assuredly deserves.

K.

Extracts from the Proceedings of the Berwickshire Naturalists' Club.

“*Description of an Agaric new to the British Flora. Agaricus caperatus.*—*Pileus* convex, orbiculate, obtusely umbonate, even, very dry, of a uniform gall-stone yellow, usually paler about the top, covered with a mealy powder of the same colour, which, in some places, is gathered into an imperfect scaliness, the margin inflected, entire or more or less sinuated: *veil* as thick as writing paper, persistent, stretched between the margin and stem, to which it is closely attached, thickly covered with the same powder as the pileus, but more distinctly squammulose: *flesh* thick, solid and firm, white, not changing colour, mild and insipid in taste. *Gills* numerous, adnate, four in a set, dry and smooth, sienna-yellow, juiceless: *sporules* elliptical, very light honey-yellow. *Stem* cylindrical, as thick as a man's thumb, erect and solid, the root rounded but not bulbous, whitened with the mycelia, the shaft of the same colour as the pileus, paler on the lower half, covered with the ochraceous powder or slightly squammulose, the flesh white, yellowish under the epidermis; the portion of stalk within the veil is pale, a very little fibrillose, but not powdered. Diameter of the pileus 3 inches; height of the stem 5 inches, the diameter nearly an inch; breadth of the gills 2-10ths. From the woods at Anton's-hill, Sept. 16, 1845.

“This truly magnificent agaric was ascertained satisfactorily to be the *Agaricus caperatus* of Fl. Dan. t. 1675, by the Rev. M. J. Berkeley, to whom a specimen was sent. It is not the *Agaricus caperatus* of the English Flora, nor the *Agaricus pudicus* of Bulliard; and is a beautiful addition to the already extensive list of British species, for which we are indebted to the researches of Miss Anne Hunter, an honorary member of the Club. The spores, Mr. Berkeley says, are very peculiar. ‘Its greatest peculiarity,’ says Miss Anne Hunter, ‘is its being so profusely covered over its pileus, curtain, and stem, with a yellowish powder, in such quantities as to make it disagreeable to gather, as gloves and everything it came in contact with was covered. And I am much struck with the toughness and permanency of the curtain, which remains after the pileus has attained its full size.’

“When small and young the pileus is obtusely campanulate, but in other respects it does not differ from the mature plant. Miss Hunter has found it on one spot only in the wood behind the house of Anton's-hill, and there sparingly. Like most of its genus it is eaten greedily by slugs and the maggot of a dipterous fly; and it seems to

be, says Miss Hunter, 'a most favourite food of a sort of beetle,' which permits very few specimens to attain maturity without great mutilation."

"On the Medical Properties of our Geraniums. By Dr. Johnston.—A few weeks ago my friend Dr. Edgar brought a plant to me to have it named. It was a dried fragment of *Geranium pratense*. The Doctor told me that a person resident in or about Ford had acquired great local fame, for the cure of fluxes in general, and the only remedy used was an infusion of this *Geranium*. One dozen stalks are 'masked' in a pint of boiling water, and of this two ounces are taken three times a-day. Dr. Edgar's interest had been raised by the cure of a patient of his own, who had been greatly reduced by a chronic diarrhœa that had resisted the ordinary medicinal treatment, but yielded speedily to the geranium infusion. He felt relief from the second dose, and continuing to take it for three or four days, he was permanently cured. It was said to be a good medicine in the diarrhœa of teething children, and is easily taken by them, for the taste is 'like tea without sugar, rather sweeter.'

"It is very likely that this remedy is inferior, for general use, to more powerful vegetable and mineral astringents of modern introduction into practice, but I think it worth while to bring the subject before the Club, since it relates to a matter of local interest; and there are cases in which it is well for a medical man to have a wide range of medicines to ring the changes upon. No *Geranium* has now a place in any British Pharmacopœia,* but several species hold a conspicuous place in the old Herbals. Of *Geranium pratense* and its immediate allies, Gerarde says, 'none of these plants are now in vse in physicke; yet Fuschius sayeth that cranes-bill with the blew floure (*G. pratense*) is an excellent thing to heale wounds.' Our author speaks in very different terms of our commoner species, *Ger. molle* and *dissectum*. 'The herbe and roots dried,' says he, 'beaten into most fine powder, and given halfe a spoonful fasting, and the like quantitie to bedwards in red wine, or old claret, for the space of one and twentie days together, cureth miraculously ruptures or burstings, as myselfe have often proved, whereby I haue gotten crownes and credit: if the ruptures be in aged persons, it shall be needful to adde thereto the powder of red snailles (those without shels) dried in an ouen, in number nine, which fortifie the herbs in such sort, that it neuer faileth,

* Several *Gerania* are introduced into Dr. Stokes' 'Botanical Materia Medica,' but without any indication of their properties.

although the rupture be great and of long continuance : it likewise profiteth much those that are wounded into the body, and the decoction of the herbe made in wine, prevaileth mightily in healing inward wounds, as myselfe haue likewise proved.' (Historie of Plants, p. 939).

"Ray also furnishes us with a proof of the medicinal virtæ of the Gerania. When he tells us that *Geranium molle* and *robertanium* are added to vulnerary potions and fomentations to stay fluxes and effusions of blood, and to relieve the pains of cholick, and of the stone and gravel, he merely gives us a summary of preceding observation; but he speaks from his own knowledge, when he details the case of his host at Carlisle, who, subject to frequent severe paroxysms of pain from calculus, found in nothing so much relief as from a decoction of *Ger. robertanium*. (Syn. p. 361.) In a subsequent work, after repeating its virtues as a vulnerary herb, Ray mentions that a decoction of the same species is used by shepherds to cure their cattle passing bloody urine. (Hist. Plant. ii. p. 1059).

"Geiger informs us that *G. pratense* and *sanguineum* were formerly officinal, the root and herb being used, both having an unpleasant odour, and a very astringent taste, which is contrary to Dr. Edgar's information. Other compilers repeat the same tale of the astringency of the Gerania in general, and of their popular use in fluxes and diseases of relaxation; but it is foreign to my purpose to enter farther on the subject than what is sufficient to show that the virtue ascribed to our district species is not imaginary."

Occurrence of Polypodium calcareum at Coldwell Rocks, Herefordshire. By W. H. PURCHAS, Esq.

IN the 'Phytologist' for October last is a blunder of mine, which I will thank you to correct. I have, at page 650, said that *Polypodium Dryopteris* grows plentifully at the Coldwell Rocks; it should be *P. calcareum*. The Penyard station only belongs to *P. Dryopteris*.

W. H. PURCHAS.

Ross.

[Mr. Purchas has kindly sent me a specimen, which I find to be the rarer species as mentioned above.—*Edward Newman*.]

Notice of 'Outlines of Structural and Physiological Botany. By
ARTHUR HENFREY, F.L.S. Parts III. and IV. Organs of Re-
production and General Physiology.'

WE have already spoken of the prior parts of this little work with approbation: the portion now before us confirms the good opinion then entertained, although perhaps it has somewhat less claim to the title of originality. In compilations of this kind, great advantage accrues from the author's familiarity with the subject itself, not simply with its bibliography; and this familiarity was, as we thought, particularly evident in Part I. It is less the case now; Mr. Henfrey seems to trust the eyes of others in preference to his own: this probably results from timidity on the part of the lecturer,—a needless fear, for his audience are not stern critics, and would be as well pleased to trust the personal observations of a Henfrey as those of a Martius or Gélésnow. Experience has shown us, that of all classes of Her Majesty's subjects, medical students are the least addicted to criticise the authority; all they care for is, to obtain that very superficial acquaintance with the subject, and those authentic certificates of attendance, which serve as vouchers for the possession of botanical knowledge.

Mr. Henfrey explains on the wrapper, that the work was "undertaken in consequence of the pressing want of some Manual which will put the Student in possession of the results of the numerous and important researches which have been published during the last few years in this department of Science. The fact of these being scattered through various journals, English and foreign, or contained in the voluminous works which testify so strongly to the industry of German observers, places them beyond the reach of many who are interested in them, and especially of those whose time is so valuable as that of Medical Students."

And for such a purpose we cordially recommend this little volume: it is concise, yet explanatory,—scientific, without pedantry or affectation; and we hope its circulation will not be confined to that peculiar class for which it appears to have been designed, but that it will work its way into other schools than those of medicine, and find a welcome in the popular as well as professional lecture-room. It is the very thing for the popular lecturers that perambulate the outskirts of London, and will save them a world of blunders, and their audience from a world of trash.

O. P.

*Notice of the 'London Journal of Botany,' Nos. 60 to 64, dated
December, 1846, to April, 1847.*

No. 60. Contents: "Memoir of the Life of Dr. J. R. T. Vogel" (continued from the preceding No.). "Journal of the Voyage to the Niger," by Dr. Vogel. "Sur le genre *Godoya* et ses analogues, avec des Observations sur les limites des *Ochnucées*, et une Revue des genres et espèces de ce groupe," by J. E. Planchon, Docteur-es-sciences (continued from page 600). "Botanical Information;" including a letter from Dr. Ludwig Leickhardt, a traveller in Australia; a Notice of Bloxam's 'Specimens of British Rubi;' a short account of the tomb of Allan Cunningham, with a lithographic sketch.

No. 61. Contents: "Sur le genre *Godoya*," &c. (continued from page 656 of the preceding No.). "Botanical Information;" including a notice of *Thorea ramosissima* being found in the Thames at Walton Bridge; some account of the 'Gutta Percha,' a substitute for caoutchouc; a note on Borgeau's 'Canary Plants;' notice of a projected journey into Bosnia, by a collector of botanical and natural-historical specimens; a short letter from Mr. Stephenson, botanist in Sir Thomas Mitchell's Expedition in Australia; notice of Mr. Purdie's appointment to the Botanic Garden of Trinidad; extract of a letter from Mr. Gardner, relating to the Botany of Ceylon; notes of a continental tour in 1846, by an anonymous friend of the Editor (continued from the preceding vol.); a notice of Gardner's 'Travels in Brazil.'

No. 62. Contents: "Botanical Information;" including notices of Lindley's 'Orchidaceæ Lindenianæ,'—of Martius's 'Voyage Botanique le long des côtes septentrionales de la Norvège,'—of a paper by Mr. Gardner 'On the Structure and Affinities of the Plants belonging to the natural order of Podostemaceæ,'—of a memoir by Schultz 'On Hypochærideæ,'—of Parlatore's 'Flora Palermitana,' Part 1, and of the same author's 'Monografia delle Fumariæ,'—of the Continuation of Esenbeck's 'Genera Plantarum Floræ Germanicæ,' by Spenner, Putterlich and Endlicher,—of Miers's 'Illustrations of South American Plants,'—of Gray's 'Chloris Boreali-Americana,'—of Sullivant's 'Musci Alleghanienses,' &c.,—and commencement of a Catalogue of Geyer's Collection of American plants. "Journal of the Voyage to the Niger of Dr. J. R. T. Vogel (continued from the memoir in the preceding volume, No. 60). "Floræ Tasmaniæ Spicilegium," by Dr. J. D. Hooker.

No. 63. Contents: "Floræ Tasmaniæ Spicilegium" (continued

from the preceding No.). "Botany of the Niger Expedition," by Sir William and Dr. Hooker. "Observations sur l'Amoreuxia," &c., &c., by Dr. Planchon. "On the Economy of the Roots of *Thesium linophyllum*," by William Mitten, Esq. "Description of New Lichens," by Dr. Thomas Taylor.

No. 64. Contents: "New Lichens," by Dr. Taylor (continued from the preceding No.). "Notes of Algæ, observed at various altitudes in Aberdeenshire," by Dr. Dickie. "Botanical Information," being an announcement of the death of Delessert, and a continuation of the "Catalogue of Mr. Geyer's collection of plants gathered in the Upper Missouri," &c.

The *Thorea ramosissima* was discovered by Mr. William Mc. Ivor, of the Kew Gardens, "in the bed of the river, above Walton Bridge, at low water exposed to view abundantly, and where covered with clear water showing itself as a vast gelatinous mass of a purplish-black colour, yet exhibiting its filamentous internal structure in the same way as the *Batrachosperma* do, when seen with the naked eye." (No. 61, p. 31).

Although not relating to a British species, the following account of a Brazilian representative of a British genus is curious, and worth extracting. The account of it is introduced into the Journal from Gardner's Travels: "We shall lastly mention the beautiful and singular *Utricularia nelumbifolia* (*Gard.*), remarkable no less for its large size, 2 to 2½ feet high, than for its place of growth. Like our bladder-roots, it is aquatic, but is only found 'growing in the water which collects in the hollow bases of the leaves of a large *Tillandsia*, that inhabits abundantly an arid, rocky part of the Organ Mountains, at an elevation of about 5000 feet above the level of the sea. Besides the ordinary method, by seed, the *Utricularia* is propagated by runners, which it throws out from the base of the flower-stem; this runner is always found directing itself towards the nearest *Tillandsia*, when it inserts its point in the water, and gives origin to a new plant, which, in its turn, emits another shoot. In this manner not less than six plants may be seen united, each deriving support from the water contained in as many separate plants of *Tillandsia*.' In our plants, again, there are no leaves; but bladders (as the name implies) among the roots, which enable the plant to float and bring its blossoms above the surface of the water. In the Brazilian species there are the bladdered roots; and, besides, peltate leaves, three inches across, on long footstalks; while the flower-stem bears numerous large purple flowers." (No. 62, p. 57).

The paper by Mr. Mitten on the roots of *Thesium linophyllum* is highly interesting. The author believes the roots of this and other species of the same genus to be parasitically attached to the roots of various other plants among which it grows. Should this view turn out to be correct, we may look for parasitical attachments in the roots of some other plants, whose roots form tubercles more or less resembling those of the *Thesium*. We gain, too, by Mr. Mitten's discovery, a collateral support to Dr. Lindley's position of the Santalaceæ (the natural order to which the *Thesium* belongs) in the same alliance with Loranthaceæ (the natural order which includes the *Viscum* and other parasites). We shall copy a part of the paper, explanatory of Mr. Mitten's investigations, as a separate article.

The paper by Dr. Dickie, on the Algæ found at various altitudes in the Highlands, is an useful commencement of its subject; but the facts can be received only as *isolated* facts at present; the generalization of them into a numerical table being surely too premature for much reliance. The author finds 15 species at 3000 feet, 16 species at 2000 feet, 37 species at 1000 feet, 68 species about Aberdeen (at and near the sea-level); the whole number of British species in the 14 genera being 78.

Of the other papers in these Nos. the interest can be deemed only very partial; that is to say, the papers may have interest respectively for small sections of the botanical world, though none of them can be deemed of general interest. For instance, fifty consecutive pages devoted to descriptions of Lichens from distant countries, will hardly be cut open by one in ten of the subscribers to the Journal, although novel contributions to science, and necessary records of its facts.

C.

“*On the Economy of the Roots of Thesium linophyllum.*”

“By WILLIAM MITTEN, Esq.”

(Extracted from the ‘London Journal of Botany’ for March, 1847).

“The remarkable nature of the root of *Thesium linophyllum* has apparently hitherto altogether escaped attention. Indeed, from the general appearance of the plant, there is nothing to excite suspicion; nor will there be any trace left of its parasitical attachment to the roots of surrounding plants unless the roots are taken up with the

greatest care. The very brittle roots of the *Thesium* itself, and the closely interwoven roots of the many plants which compose the turf of the chalk hills, render the extrication of a perfect specimen a labour requiring no small degree of patience. The root of *Thesium*, after descending into the turf for about an inch, becomes repeatedly divided, and spreads for many inches in various directions. It is nearly white, and thus contrasts strongly with the dark epidermis of the roots of the generality of its supporters. On coming in contact with the root of its future support, the root of *Thesium* produces a hemispherical tubercle, which firmly fixes itself; while from its centre protrudes a tongue-like process (spongiola), which penetrates into the very heart of its supporter, often causing very considerable derangement in its tissues. After the perfection of the first tubercle, the root is continued from the side of the tubercle, so as to give it the appearance of having been formed laterally, and proceeds at greater or less intervals to form more tubercles in the same manner on the same or neighbouring roots. On the larger roots of its supporters it is not usual to find more than one or two tubercles; and these are mostly large: the largest I have seen being about the eighth of an inch in diameter; but on the fibrous roots of grasses and other small plants they are very small, and may be frequently found succeeding each other so quickly as to resemble a string of beads.

“Like *Cuscuta*, our species of *Thesium* appears to be by no means particular in the selection of its supporters; and I have ascertained its attachment to the roots of the following plants, namely, *Anthyllis vulneraria*, *Thymus Serpyllum*, *Lotus corniculatus*, *Daucus Carota*, *Scabiosa succisa*, *Carex glauca*, and some grasses. It is probable that a single plant of *Thesium* subsists, at the same time, on the roots of the whole of the plants above enumerated.

“Through the kindness of Mr. Borrer I have been able to examine the specimens published in Reichenbach’s ‘*Flora Exsiccata*,’ and I find the roots of *Thesium alpinum* (*Linn.*), *T. ebracteatum* (*Hayne*), *T. rostratum* (*Koch*), and *T. linophyllum* (*Linn.*), to have precisely the same structure as that of our own species. Unfortunately the roots of the other species contained in this collection were too imperfect to afford any information; but from the very close relationship of all the European species, there is good ground to infer that they are all of the same parasitical nature.”

List of Ferns and Allied Plants found in the Vicinity of Coventry, and other Localities in the County of Warwick. By THOS. KIRK, Esq.

Ceterach officinarum. On a wall in the Lancastrian Yard, Coventry, but sparingly. Probably this little fern has a more plentiful habitat at no great distance from this, as the river Sherborne flows by the bottom of the yard. It is rather curious that *Lastræa Filix-mas* is found on the same wall.

Polypodium vulgare. Common on shady banks, &c.

———— *β. serratum.* On a bank near Meriden church.

Polystichum lobatum and *aculeatum.* Abundant in the vicinity of Stoneleigh,—about Allesley,—Hollyberry-end,—Wyken Lane, and other places.

———— *β. lonchitoides.* Near Stoneleigh—Meriden. I have cultivated some plants of this variety procured from the vicinity of Meriden, for upwards of two years, the fronds of which retain their original character, and are now sparingly sprinkled with fructification. Their texture is much more rigid than the typical form.

Polystichum angulare, Willd. Near Stonleigh Mill,—near Berkswell,—Hollyberry-end,—Stivichall Grove,—Whitmore Park,—sparingly on Hearsall Common, and other places.

Lastræa Oreopteris. Sparingly near Allesley,—in the Deer Park and North Wood, Arbury Hall.

———— *Filix-mas.* Common.

———— *multiflora,* Newm. Sparingly on Stoke Heath,—Foleshill,—Stivichall and Whitley Commons. Plentiful and very fine in the North and other Woods, Arbury Hall.

———— *spinosa,* Newm. In a boggy place near Binley. In the North Wood, Arbury Hall.

A red-stemmed variety, which is stouter and more leafy than the ordinary form, occurs in a moist part of the last-named locality.

Athyrium Filix-fœmina. Sparingly on Stivichall and Hearsall Commons,—near Stoneleigh Mill,—boggy place near Binley,—in the Deer Park, Arbury Hall.

———— var. *irriguum.* Boggy place near Binley,—in the Deer Park, Arbury Hall,—Stoke Heath.

A Middlesex plant of this variety that I have had under cultivation for two years has passed into an elegant state of the var. *convexum,* Newm. Plants from the Stoke Heath locality, cultivated for

about the same period of time, still retain their peculiar dwarf character, and present a very elegant appearance.

Athyrium Filix-femina, var. *convexum*, Newm., (*A. rheticum*, Roth). In the Deer Park, Arbury Hall.

A red-stalked variety of this, and also of the typical form, occurs in the same locality. I humbly venture to think this so-called variety to be a mere *state* of the original form. I have collected specimens that exhibit the convexity throughout the entire frond, whilst in others only those pinnæ towards the tip of the frond are convex; with a great variety of intermediate states.

———— var. *molle*. In the Deer Park, Arbury Hall.

Asplenium Trichomanes. In the walls of an old bath, and on a stone wall in the Deer Park, Arbury Hall,—Stair Bridge,—Bridge in Stonleigh Deer Park,—near Dog-kennell Lodge, Stonleigh Abbey.

Asplenium Adiantum-nigrum. In a lane near Berkswell,—lanes between Meriden and Hollyberry-end,—on a Bridge near Binley—on Coventry Town Wall, but almost eradicated,—on a wall at Kenilworth Castle, in 1845.

———— *Ruta-muraria*. On Stair Bridge,—on an old brick wall at Stonleigh Abbey,—on Coventry Town Wall,—on the ruins of Nuneaton Priory.

Scolopendrium vulgare. In shady and damp places; generally common.

Blechnum boreale. Stoke Heath,—Woods, Arbury Hall; very fine, not uncommon.

Pteris aquilina. Stivichall and Hearsall Commons,—Woods, Arbury Hall, &c.

Ophioglossum vulgatum. Pastures, Foleshill, but almost eradicated, it being much sought after by rustic herbalists for the purpose of making an ointment.

Equisetum Telmateia. In a marly and swampy situation (not by the side of water) in the North Wood, Arbury Hall.

Equisetum arvense. Common.

Equisetum fluviatile, Linn., (*E. limosum*, Smith). Side of the canal, and in standing waters on Stoke Heath,—ditch in the North Meadow, Arbury Hall,—Pond at Burn Poat.

Equisetum palustre. In a ditch in the North Meadow, Arbury Hall, &c.

THOMAS KIRK.

Coventry, April 12, 1847.

Note on Cynodon dactylon at Kew Green.

By THOMAS MEEHAN, Esq.

IN an early number of the 'Phytologist' I observed Kew Green noticed as a station for *Cynodon dactylon*. Many botanists to whom I mentioned the circumstance expressed doubts as to its being really indigenous there, or that it was anything more than an escape from the Botanic Garden. I had an opportunity of examining the given station personally last autumn, and found the plant confined to about a square yard of ground, in the east corner of the Green, where I have no doubt it springs from a stray plant or seeds at no very distant date.

From the creeping nature of its roots it will doubtless soon spread over a good extent of ground, and if left undisturbed, become fairly naturalized.

THOMAS MEEHAN.

Kew, April 7, 1847.

On Medicago denticulata. By Mr. J. W. LAWRENCE.

It may be interesting to those botanists residing near London to know that *Medicago denticulata* (*Willd.*) grows rather plentifully near the great metropolis. In June last I gathered a quantity of specimens from plants growing in a field between Turnham Green and Acton.

JOHN W. LAWRENCE.

Royal Gardens, Windsor,
April 2nd, 1847.

Occurrence of British Plants on the Mediterranean Coasts.

By A. J. HAMBURGH, Esq., F.G.S.

DURING a cruise on the coasts of the Mediterranean in the summer of 1843, I took much pleasure in noting down, as often as I happened to meet with them, every old acquaintance familiar to me as a plant indigenous to Britain.

I know not whether you would deem this catalogue worthy of a page in the 'Phytologist, but thinking that perhaps it might be of

some interest, as tending in a measure to illustrate the range and dispersion of species, I have ventured to enclose it to you.

The numbers affixed are intended to give some idea of the relative abundance or scarcity of each plant.

ROCK OF GIBRALTAR, July, 1843.

<i>Parietaria officinalis</i>	20	<i>Crithmum maritimum</i>	10
<i>Lagurus ovatus</i>	10	<i>Glaucium luteum</i>	5

MARSEILLES, August, 1843, Hill of Fort La Gude.

<i>Dianthus prolifer</i>	10	<i>Sinapis tenuifolia</i>	10
<i>Fœnicula officinalis</i>	20	<i>Geranium rotundifolium</i>	5
<i>Plantago Coronopus</i>	20	<i>Centaurea Calcitrapa</i>	20
<i>Aira stricta</i>	20	———— solstitialis	10
<i>Poa vivipara</i>	20	<i>Euphorbia Paralias</i>	20
<i>Lepidium ruderales</i>	10		

TOULON, August, 1843.

<i>Oxalis corniculata</i> ,		<i>Eupatorium cannabinum</i>	1
road-sides	20	<i>Juniperus communis</i>	10
<i>Centaurea Calcitrapa</i>	20	<i>Asplenium Trichomanes</i>	5
<i>Cnicus lanceolatus</i>	5	<i>Ceterach officinarum</i>	2
<i>Euphorbia Peplis</i>	10		

NICE, August, 1843, road to the Convent above the town.

<i>Galium verum</i>	4	<i>Euphorbia Peplis</i>	10
<i>Valeriana rubra</i>	10	<i>Salvia Verbenaca</i>	5
<i>Parietaria officinalis</i>	20	<i>Centaurea Calcitrapa</i>	10
<i>Koniga maritima</i>	4	<i>Verbascum Thapsus</i>	4
<i>Sinapis tenuifolia</i>	20	<i>Campanula rotundifolia</i> .	Very
<i>Asplenium Trichomanes</i>	10	large, with the peculiar ra-	
<i>Ceterach officinarum</i>	5	dical leaves invariably pre-	
<i>Oxalis corniculata</i> (cultivated		sent whilst in flower	
fields, amongst olives)			

Hills above MONACO, August, 1843.

<i>Helminthia echioides</i>	5	<i>Tamarix anglica</i> . On the shore	
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Cornice road between NICE and GENOA, August, 1843.

Samolus Valerandi	3	Linaria spuria	5
Anagallis cærulea	5	Antirrhinum minor	2
—— arvensis	10	Campanula Trachelium	2
Medicago lupulina	10	Agrimonia Eupatoria	1
Parietaria officinalis	20	Senecio aquatica	2
Verbena officinalis	5	Origanum vulgare	5
Oxalis corniculata. Under walls		Chlora perfoliata	10
Pteris aquilina	10	Clinopodium vulgare	
Glaucium luteum	5	Adiantum Capillus-Veneris	
Galium verum	5	Polystichum angulare, <i>Newm.</i>	
Crithmum maritimum	10		

POMPEII, September, 1843.

Bartsia Odontites	5	Chrysanthemum luteum	5
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SYRACUSE, Sicily, 1843.

Datura Stramonium	20	Adiantum Capillus-Veneris	
A. J. HAMBURGH, F.G.S., &c.			

Niton, Isle of Wight.

BOTANICAL SOCIETY OF EDINBURGH.

Thursday, March 11th, 1847.—Professor Balfour in the chair.

Donations to the museum were announced from Mr. William M'Ivor, Royal Gardens, Kew, and Mr. John Laing, Experimental Garden, Edinburgh.

The following communications were read :—

1. List of plants collected in the neighbourhood of Auchincairn, Kirkcudbrightshire, in July and August, 1846. By W. Wells, Esq., communicated by Sir Wm. Jardine, Bart. The author enumerated the plants which he had noticed in the district named, among which were many rare and some interesting Alpine species. Among the latter several were considered as dubious, and Sir William Jardine was requested to communicate with Mr. Wells, and endeavour to procure specimens from the localities mentioned, in order to authenticate them.

2. Description of a new species of *Dawsonia*. By Dr. Greville.

This *splendens* moss, of which a specimen and drawing were exhibited, has been named *D. superba*, by Dr. Greville. It was received among specimens from Australia; the specimen exhibited was fourteen inches high, with leaves fully an inch in length.

3. Notice of Palms at present in flower in the Royal Botanic Garden. By Dr. Balfour. He described *Livistona chinensis*, *Mart.*, and exhibited a specimen of the flowering spadix, and a drawing of the plant. The plant in the garden is about thirty-six years old, twenty-five feet high, and the stem at the base has a diameter of twenty-two inches. The leaves are upwards of thirteen feet long, and the blade of the leaf seven feet across; the spadices four to four-and-a-half feet long. It is believed that this is the first time the palm has flowered in Britain. Dr. B. exhibited the spadix and flowering stem of *Euterpe montana*, *Graham*, or mountain cabbage-palm; and stated that the plant in the garden used to fruit regularly, but of late years no fruit has been produced, although it continues to flower abundantly. The palm is now thirty feet in height. He also mentioned that a specimen of *Chamærops humilis*, or European fan-palm, in the garden, which has for many years produced stamiferous flowers only, had this season produced stamiferous and pistilliferous flowers, and that the fruit was apparently perfect.

Dr. Balfour stated that he had obtained information that the *Luzula nivea*, discovered last year in a wood near Broomhall, by Dr. Dewar, had been planted there by the former gardener, so that it can have no claim to rank as a British plant.

The following gentlemen were admitted ordinary members: Nicolson C. Mackenzie, Esq., 4, Hill Square; Luiz A. da Camara, Esq., 62, Hanover Street, Edinburgh; and Thomas Inman, Esq., M.D., Liverpool.—*W. W. E.*

BOTANICAL SOCIETY OF LONDON.

April 9, 1847.—Edward Doubleday, Esq., Vice President, F.L.S., in the chair.

The following donations were announced:—

'*Cybele Britannica*,' vol. i., by Mr. Hewett Watson, presented by the author; '*Outlines of Botany*' (Parts 3 and 4), by Mr. A. Henfrey, presented by the author; '*Journal of the Royal Agricultural Society of England*,' presented by that Society; '*On the Preven-*

tion and Treatment of the Potato Disease,' by Dr. Parkin, presented by the author.

Mr. T. Burnet, of Newcastle-upon-Tyne, Mr. F. H. Goulding, of King William Street, Strand, Dr. Farran, of Stradbally, Waterford, Ireland, Mr. J. W. G. Gutch, of Great Portland Street, Marylebone, and Mrs. Riley, of Papplewick, near Nottingham, were elected members.

Mr. REYNOLDS, the treasurer, brought forward the subject of the testimonial presented by the members to Mr. G. E. Dennes, the secretary of the society, and bore testimony in warm language to the indefatigable zeal and great services of that gentleman in the cause of science in general, and more particularly in promoting the interests of the society during the many years that he had devoted his time gratuitously to the labours of his office. The testimonial consisted of a portrait of Mr. Dennes, painted in oils, by Mrs. Carpenter, and which he had re-presented to the society, to be placed in their rooms.

The CHAIRMAN and several members concurred fully in the observations of the treasurer.

The SECRETARY returned thanks in suitable terms for the gratifying manner in which his services were appreciated.

A letter was read from Dr. Parkin, accompanying a copy of his work on the prevention and treatment of the potato disease. It alluded to the value of charcoal as a preventive of the disease, and mentioned some experiments in which the development of carbonic acid, by the mutual decomposition of muriate of soda and carbonate of lime in the soil, was attended with the best results in producing a healthy crop.

A paper was also read from Mr. W. Taylor, F.L.S., on the same subject. Mr. Taylor appeared to attribute the disease to atmospheric causes, and not to any diminished vitality produced by over-cultivation, and in proof of the latter not being the origin of the disease, he mentioned that the *Solanum*, or wild potato, was found in America to be as much diseased as the cultivated varieties.

The CHAIRMAN said he hoped it would go forth that the theory attributing the disease to the ravages of a particular kind of insect, and which had been promulgated with the most unceasing and unaccountable pertinacity, was repudiated by every scientific man whose opinion was entitled to any weight. Mr. Smee had been challenged to attend their meetings and defend his theory, but he had not done so. He mentioned this subject because the manner in which articles were forced into local newspapers in every part of the kingdom, describing

the cause of the disease to have been satisfactorily ascertained, when scientific men actually knew nothing whatever about it, in his opinion, was calculated to produce very considerable mischief. He even saw it stated in a leading article in the 'Times' a few days ago, as a settled fact, that the potato disease was caused by the *Aphis vastator*, and yet he had been unable to find a single scientific man, capable of trustworthy investigation, who gave the slightest countenance to such an absurdity. The chairman, in conclusion, mentioned the names of several of the leading botanists and naturalists of France, Belgium, America, and England, who were all opposed to Mr. Smee's theory.

DR. AYRES said, in allusion to Dr. Parkin's publication, that he did not think the action of muriate of soda upon carbonate of lime would extricate carbonic acid, unless additional acid already existed in the soil. In reply to a question from the chairman, he added that he had examined a quantity of diseased leaves of the potato plant without being able to find even the skin of an *Aphis* upon them, though it was well known that these animals frequently changed their coverings during the season.

MR. HASSALL said he perfectly agreed with what had fallen from the chairman respecting the *Aphis*. In his opinion the potato-disease was caused by Fungi, and this view was strengthened by the fact, that if the sporules of a fungus be shaken over a sound tuber, or other soft cellular tissue, the disease will be produced in a few hours.

MR. N. B. WARD said he visited Ireland in July last, and traversed an extensive district in company with one of the most distinguished of living botanists — Dr. Harvey, of the University of Dublin — but though they saw field after field destroyed by the disease in a single night, they could only arrive at the conclusion that neither Fungi nor Aphides had anything to do with producing the disease. That they were, in fact, the result, and not the cause, and that the origin must be traced in some atmospheric influence.

MR. HASSALL would not deny that the atmosphere had a powerful existing influence in extending the disease, but he did not think it was the proximate cause. He did not consider it scientific to follow the old system of attributing all diseases of which the origin was doubtful to the influence of the atmosphere.

MR. WARD said, in attributing the disease to atmospheric influence, he merely intended to intimate that he had no knowledge whatever of the real cause of the disease.

The CHAIRMAN said, Fungi and insects made their appearance in

myriads at particular times, and it could not be doubted but that the state of the atmosphere had some direct influence in producing their extraordinary development on such occasions.

Dr. AYRES said it had been ascertained that there was a deficiency in the development of starch granules in the diseased potatoes to the extent, he believed, of ten per cent. compared with the quantity usually in healthy tubers. There must, therefore, be a greater proportion of fluid present in the root, and a consequent defect of vitality, which would render the plant more liable to the attacks both of fungi and of animals. It was remarkable that all the varieties of fungi found on the diseased potatoes—some dozen he believed in number—were those usually seen on decaying vegetable matter, whereas in the case of the smut in wheat, where another kind of fungus appeared, the stem and leaves of the plant remained perfectly healthy, though the smut invariably made its appearance if the spores had been sown with the wheat in the ground.

Mr. HASSALL said he could not agree in Dr. Ayres' remarks. If two apples growing on the same tree were perforated, and the spores of the fungi applied to one, it would be found that the apple so impregnated would become diseased, while the other continued to grow.

Dr. AYRES said it was clear that in wounding the apples in the first instance the vitality of the cellular tissue was impaired, and the fungi were then able to act upon it, which was the very point for which he contended.

Mr. WARD said if the leaf of any plant were bruised, so as to injure its vitality, fungi would make their appearance upon it as a natural consequence.

Dr. AYRES said there could be no doubt but that fungi were very powerful agents in the economy of nature. For instance, it was now known that the phenomena of fermentation were produced by fungi, and that their influence had the effect in that case of dividing the sugar into alcohol and carbonic acid.

The CHAIRMAN, in closing the discussion, said there was at all events one point on which they were unanimously agreed, and that was, that the real cause of the potato-disease had not yet been clearly ascertained, or at all events that the *Aphis rapæ*, or as Mr. Smee termed it, the *Aphis vastator*, had nothing to do with it.

The subject was then adjourned to the next meeting, on the 7th of May, and the proceedings terminated.—*Evening Chronicle*, April 12.

MICROSCOPICAL SOCIETY.

March 17th, 1847.—J. S. Bowerbank, Esq., F.R.S., President, in the chair.

A paper by Mr. Dean, "On the Growth of Fungus in the Stomata of *Cactus niger*," was read. The author commenced by stating the difficulty which existed in ascertaining whether the stomata of plants were pores, either actually opening to the outward air, or covered with a delicate membrane, or organs possessing no opening at all. He then stated that a circumstance he had observed in a plant of *Cactus niger*, which was growing in a Ward's case, and which died in the course of the winter, might probably throw some light on the subject. Upon examining this plant, a portion of the surface near the top was found to be covered with small black patches, which, on applying the microscope, presented the appearance of being formed of tufts of pear-shaped granules attached end to end. Upon more minute investigation it was found that these tufts had their attachment in the stomata, and from them proceeded a net-work of filaments, spreading in every direction into the body of the plant, and breaking up its whole structure. These filaments vary in size from the $\frac{1}{150000}$ to the $\frac{1}{450000}$ th of an inch. When they pass through the stomata their character alters, as they then bear fruit, either single on short peduncles, or attached end to end, frequently to the number of six or eight. Another plant (a *Stapelia*) growing in the same case had a few weeks before been almost suddenly destroyed by an unknown cause, which appeared to proceed from the roots upwards, but which at the time Mr. Dean did not investigate, although he has no doubt that it was the presence of a similar parasite, as he feels convinced that the sporules of the fungus enter by the roots, and gradually but rapidly extend themselves upwards, and when the plant is totally destroyed then they protrude themselves through the stomata, as offering less resistance to their progress than any other part of the tough epidermis, and thus proving, in his opinion, that the stomata, if not open, are at most covered with a membrane much thinner than any other portion of the surface, and thus readily allowing these minute fungi to find their way from the interior to the exterior.

Another paper by the same gentleman was also read, "On the Source whence the Siliceous Cases of Infusorial Animalcules in Ichaboe Guano are derived." After premising that aquatic birds, in addition to fish, feed largely on marine plants, he proceeded to state that on a plant of this kind from Japan, used exclusively in China as

an ingredient in soups, the name of which he had been unable to ascertain, he had found imbedded in great abundance, round disks precisely similar to those found in the guano. He had also found them on another marine plant from the Mauritius (*Thamnophora Telfaria*). From this he infers that these or similar plants inhabited by these Infusoria are eaten by the birds, and as the shells, from their siliceous nature, are not acted upon by the process of digestion, they remain unchanged in the excrements of which the guano is almost wholly composed.—*J. W*

Observations on Guano. (Extracted from Tschudi's Travels in Peru).

"GUANO (or according to the more correct orthography, Huanu),* is found on these islands in enormous layers of from thirty-five to forty feet thick. The upper strata are of a grayish brown colour, which lower down becomes darker. In the lower strata the colour is a rusty red, as if tinged by oxide of iron. The guano becomes progressively more and more solid from the surface downward, a circumstance naturally accounted for by the gradual deposit of the strata, and the evaporation of the fluid particles. Guano is found on all the islands, and on most of the uninhabited promontories of the west coast of South America, especially in those parts within the tropics. I have often been assured that beds of guano, several feet high, covered with earth, are found inland at some distance from sea; but I never met with any, and I have some doubt of the correctness of the statement. If, however, these inland strata really exist, I am inclined to believe that they can only be found on hilly ground; and in that case they afford strong evidence of a considerable elevation of the coast.

* The original word is Huanu, which is a term in the Quichua dialect meaning 'animal dung;' for example, *Huanacuhana*, (excrement of the huanacu). As the word is now generally used, it is an abbreviation of *Pishu Huana*—'Bird-dung.' The Spaniards have converted the final syllable *nu* into *no*, as they do in all the words adopted from the Quichua which have the like termination. The European orthography, *Guano*, which is also followed in Spanish America, is quite erroneous, for the Quichua language is deficient in the letter G, as it is in several other consonants. The H, in the commencement of the word, is strongly aspirated, whence the error in the orthography of the Spaniards, who have sadly corrupted the language of the Autochthones of Peru.

"Guano is formed of the excrements of different kinds of marine birds, as mews, divers, sheerbeaks, &c. ; but the species which I can name with more precision are the following: *Larus modestus*, Tsch. ; *Rhinchops nigra*, Linn. ; *Plotus ankinga*, Linn. ; *Pelecanus thagus*, Mol. ; *Phalacrocorax Gaimardii* and *albigula*, Tsch. (*Pelecanus Gaimardii*, Less., *Carbo albigula*, Brandt), and chiefly the *Sula variegata*, Tsch.

"The immense flocks of these birds as they fly along the coast appear like clouds. When their vast numbers, their extraordinary voracity, and the facility with which they procure their food, are considered, one cannot be surprised at the magnitude of the beds of guano, which have resulted from uninterrupted accumulations during many thousands of years. I kept for some days a living *Sula variegata*, which I fed abundantly with fish. The average weight of the excrements daily was from three-and-a-half to five ounces. I have no doubt that when the bird is in a state of freedom the weight must be much greater, for these birds are constantly plunging into the sea, in order to devour the fishes which they find in extraordinary masses around all the islands. When an island is inhabited by millions of sea-birds, though two-thirds of the guano should be lost while flying, still a very considerable stratum would be accumulated in the course of a year.

"The marine birds nestle on the uninhabited islands, or on rocks near the shore ; but they never settle on the flat beach, or any place distant from it inland. On this fact I ground my conjecture that those beds of guano in the interior, which may have been removed from the shore by important elevations of the coast, are to be found only on hills.

"During the first year of the deposit the strata are white, and the guano is then called *guano blanco*. In the opinion of the Peruvian cultivators, this is the most efficacious kind. It is found in the Punta de Hormillos, on the islands of Islay, Jesus, Margarita, &c.

"As soon as the dealers in guano begin to work one of the beds, the island on which it is formed is abandoned by the birds. It has also been remarked, that since the increase of trade and navigation, they have withdrawn from the islands in the neighbourhood of the ports.

"Much has recently been written on the employment and utility of guano ; but the manner in which it is applied as manure in Peru seems to be but little known. The Peruvians use it chiefly in the cultivation of maize and potatoes. A few weeks after the seeds be-

gin to shoot, a little hollow is dug round each root, and is filled up with guano, which is afterwards covered with a layer of earth. After the lapse of twelve or fifteen hours the whole field is laid under water, and is left in that state for some hours. Of the *guano blanco* a less quantity suffices, and the field must be more speedily and abundantly watered, otherwise the roots would be destroyed. The effect of this manure is incredibly rapid. In a few days the growth of a plant is doubled. If the manure be repeated a second time, but in smaller quantity, a rich harvest is certain. At least, the produce will be threefold that which would have been obtained from the unmanured soil.

“The haciendas of the valley of Chancay have, during the last fifty years, consumed annually from 33,000 to 36,000 bushels of guano brought from the islands of Chancha and Pisco. The price of the bushel of coloured guano is one dollar and a quarter, and the price of the white from two to three dollars. The price has recently undergone many fluctuations, in consequence of the great exports to Europe.

“The employment of this kind of manure is very ancient in Peru; and there is authentic evidence of its having been used in the time of the Incas. The white guano was then chiefly found on the islands opposite to Chincha; so that for upwards of six hundred years the deposit has been progressively removed from those islands without any apparent decrease of the accumulation. The uniformity of climate on a coast where there is not much rain, must contribute to render the Peruvian guano a more arid manure than the African, as fewer of the saline particles of the former being in solution, they are consequently less subject to evaporation.”—*Tschudi's Travels in Peru*, 239.

[As there have already appeared in the pages of the ‘Phytologist’ certain interesting observations on the subject of guano, we trust the preceding quotation, although not strictly phytological, will be acceptable to our readers.—*Ed.*].

Vernal Appearances at St. Bees, Cumberland.

By E. J. R. HUGHES, Esq.

KNOWING that any correct observations of natural phenomena are not unacceptable to you in your editorial capacity, I venture to send you the following list of observations made in my rural rambles, prin-

cipally in the neighbourhood of St. Bees, Cumberland, in the months of January, February and March, 1847.

JANUARY.

- 23. Furze (*Ulex europæus*), fl. half open.
- „ Honeysuckle, leaves partially open.
- 26. Daisy, fl. not very abundant.
- 29. Snowdrop, fl.

FEBRUARY.

- 2. Hazel, catkins open.
- 4. Groundsel in fl.
- 8. Woodruff (*Asperula odorata*), leaves first open.
- 14. Laurustinus (*Viburnum tinus*), first in fl.
- 18. Elder (*Sambucus niger*), leaves first open.
- „ Picked primrose (*P. vulgare*), in bud, having a root, it was potted, and was on the 20th in full bloom.
- 21. Crocus, first in fl.
- 23. Colt'sfoot (*Tussilago farfara*), first in fl.
- „ Picked a primrose (*P. vulgaris*), full bloom.
- 25. Dandelion (*Taraxacum officinale*), first in fl.
- „ Strawberry, first in fl.
- 28. Lilac (*Syringa vulgaris*), leaves first open.

MARCH.

- 5. Pilewort (*Ranunculus ficaria*), first in fl. on a bank, Whitehaven, observed by Mr. J. Dixon.
- 7. Privet (*Ligustrum vulgare*), leaves first open.
- 8. Hydrangea, leaves first open.
- „ Kerria Japonica, leaves first open.
- 13. Pilewort (*R. fic.*), at St. Bees, first in fl.
- „ Blackberry (*Rubus fruticosus*), leaves first open.
- 15. Gooseberry, leaves first open.
- 17. Red currant, leaves first open.
- 22. Daffodil first in fl.
- 23. Sweet violet first in fl.
- 25. Broom, leaves first open.
- „ Wood sorrel (*Oxalis acetosella*) first in fl., observed by Miss M. L. Jenkins, Whitehaven.

- 26. Syringa, leaves first open.
- 28. Whitethorn, leaves first open.
- „ Dog-rose, leaves first open.
- „ Sweet briar, leaves first open.
- „ Willow catkins open.
- 29. Bitter cress (*Cardamine hirsuta*) first in fl.
- 30. Wood anemone first in fl.

If you think the above at all useful I will, at the end of June, send you my observations again.

E. J. R. HUGHES.

St. Bees, Cumberland,
April 8, 1847.

*Occurrence of a White-flowered Variety of Epilobium montanum
in Fifeshire.* By GEORGE LAWSON, Esq.

DURING the summer of last year I had the pleasure of meeting with a beautiful variety of the *Epilobium montanum*, bearing pure milk-white blossoms, growing in a neglected and weed-grown ditch, by the margin of an out-of-the-way and little-frequented road, betwixt Airdit and the Briggs-muir, near to the village of Logie, in this county. Instances of variation in the colouring of the flowers of this plant are by no means unfrequent; but I never before found it with flowers entirely *white*. There were a good number of plants of the variety at the place I have mentioned, and these enjoyed a strict monopoly of that part of the ditch where they grew, not one rose-coloured flower daring to mingle in the mass of milky blossoms, although abundance of the usual ruddy flowers decked the hedges and way-sides and other parts of the ditch. And, indeed, I have seldom, if ever, seen this *Epilobium* so abundant and so beautiful, as by the way-sides around the place I have mentioned as the station for the white-flowered variety. I could observe nothing peculiar in the situation of the plant sufficient to account for the change of colour of the flowers.

GEORGE LAWSON.

Dairsie muir, via Cupar, Fifeshire,
20th April, 1847.

Occurrence of Lycopodium annotinum in England.

By EDWARD NEWMAN.

IN announcing the occurrence of *Lycopodium annotinum* in England, I have to apologize to its discoverer, the Rev. Robert Rolleston, of Ambleside, for expressing somewhat approaching to a doubt of the accuracy of his information. A few days since this gentleman informed me by letter that this, the rarest of British Lycopodia, and never previously found in England, had been discovered near Great Langdale. I had so repeatedly been disappointed by similar reports, finding, in every instance, that the plant turned out to be the very common *L. clavatum*, that I begged for the sight of specimens before noting so interesting a fact. Mr. Rolleston most kindly and promptly transmitted them, and they prove most incontestably the accuracy of his judgment: they are veritable specimens of the rarer species, and thus we have an English habitat of *L. annotinum* in addition to the Scotch and Welsh ones already published. Mr. Rolleston very properly declines to point out the exact locality, knowing the plant would soon be exterminated were its locality and its rarity made known to the lake guides.

EDWARD NEWMAN.

Note on the Geographical Range in Britain of Native Plants.

By EDWARD NEWMAN.

A CAREFUL perusal of Mr. Watson's 'Cybele' has led to the reflection, how great a service might be rendered to phytology generally, and to the geographical portion of that science in particular, by inserting in the pages of the 'Phytologist' a record of careful observations on the range of British species, and more particularly of those which Mr. Watson has included in his first volume. A glance at Mr. Watson's work will show how vast is the extent of information yet to be gained: his summaries, laborious though they be, are still confessedly imperfect, and in many instances seem rather to indicate the information required than that possessed. In most cases this will be seen to result mainly from the total untrustworthiness of the authorities. This untrustworthiness arises from several causes, for instance:—

1st. The interested communications of guides and dealers.

2ndly. The carelessness in recording localities in which a plant has really been gathered.

3rdly. Ignorance of species, by which a name has frequently been misapplied.

In making the proposed communications, every species, the identity of which admitted of a doubt, should be submitted to some botanist thoroughly conversant with British plants. Such, for instance, as Mr. Borrer, Dr. Bromfield, Mr. Watson, Sir William Hooker, Mr. Luxford or Mr. Babington. These gentlemen are rarely mistaken about a flowering plant, and their authority would add weight and value to every record of the kind required, and there is little doubt that either of them would lend a helping hand in such a cause. Mr. Watson's idea of giving a sketch of the range of each species is a most admirable one, and one which calls loudly for the zealous support of his botanical brethren in all parts of the empire.

The total omission of Ireland from the 'Cybele' leaves a vast field of labour open for the ardent botanists of that country, a field from whence the most interesting results may be anticipated: how little is known, even at this moment, of the heaths of Ireland! and how rich is that country in this beautiful order! It would require, not merely a railway trip or a Bianconi expedition, but a summer's residence in the west and south-west of Ireland to acquire even a moderate knowledge of her Flora. I hope the idea will not be lost sight of, but that ere long the 'Phytologist' may be made the vehicle of the 'Primitiæ' of a 'Cybele Hibernica.'

EDWARD NEWMAN.

"Note upon the Natural History of Truffles, and their Mode of Production. By M. ROBERT."

"It is well known that naturalists are by no means agreed as to the origin and mode of propagation of the truffle (*Tuber cibarium*), so highly prized by epicures. M. Robert has made some observations on these productions, which he has collected in some abundance in the forests of the department of the Basses-Alpes. They are chiefly found in the immediate neighbourhood of the evergreen oak; and scarcely ever occur beyond the shade projected by the tree. If the tree dies, or is cut down, the truffles disappear. But independently of the influence of trees in the production of truffles, there is yet

another cause favourable to their development, and which would appear to have escaped our means of observation. M. Robert believes that the truffles grow at the extremities of the radical fibrillæ of trees, and of the evergreen oak in particular, and that they are in nowise connected with the soil. When the vegetative powers of the fibres of the root are quickened by frequent rains, the fibrillæ increase in number, and the truffles are found in great abundance. He supposes, from analogy, that the truffles owe their origin to a circumstance nearly similar to that which produces galls and other excrescences upon the leaves of the oak, namely, the puncture of some insect. Two species of truffles are generally known; one of which is found in summer and autumn, and is pure and white internally, and without perfume; the other, which is collected towards the end of autumn, during the winter, and in spring, is black, and highly scented. This difference is generally attributed to the influence of the seasons; but it appears rather to result from the species of tree to which the truffle owes its origin."—*Revue Encyclopédique*, January, 1847. Read before the Académie des Sciences, January, 1847.

"Truffles are often preyed upon by a species of *Leiodes*, abundant specimens of which have been collected by Professor Henslow, at Audley End, Essex."—*Berkeley in Brit. Flor.* v. pt. 2.

Microscopic and General Observations on the Potato. By DR. TYERMAN. (*Extracted from the Fourteenth Annual Report of the Royal Cornwall Polytechnic Society*).

"HAVING been induced by the conflicting reports respecting the potato blight to make some examination of the plant, both in its natural and diseased condition, I have been urged to record the results, and I will also state some of the conclusions to which the investigation has led me.

"I have unfortunately not seen any microscopic account of the fungus, or cryptogamic parasite, which causes the decay of the vegetable. I should be glad, however, if in error, to be corrected by any other observer,—the sole motive of this paper being the discovery of the true nature of its subject. I may premise, that having used a compound microscope, capable of high magnifying power, I have not observed any *insect*, or other appearances than I proceed to describe.

"The potato plant, it is almost needless to observe, contains a quantity of water, which greatly exceeds that of all its other ingredients, the proportion contained in the tuber being nearly 80 per cent. — starch forming the principal of its remaining elements; the vegetable gluten, saline matters, &c., existing in very minute proportions. It is therefore a weakly plant and, perhaps, on that account, more easily the prey of certain minute vegetable germs which the atmosphere may be supposed always to contain in great abundance, and which (each species selecting its own soil) only await congenial occasions to render themselves visible in the growth they originate, whether on old and damp books, rotten sticks, plants, &c.

"Fungi of this class generally attack decayed substances, or such as possess weak power of life: the pea plant, for instance, whose decay is rapid as its growth, is peculiarly liable to one species, which, magnified, is a most beautiful object: its *spawn*, or web-like filaments spreading upon the surface of the leaf, and here and there throwing up fruit-bearing heads — a little field of microscopic mushrooms. Indeed, its mode of courting the surface of the pea-leaf is precisely similar to the growth of the potato fungus.

"I think it necessary to refer briefly to the healthy potato plant, as some of its appendices are of remarkable formation: I mean chiefly the small hairs or bristles which are scattered on both sides of the leaf, and more thinly on the stem, and also, small globular bodies supported on footstalks, which possibly may be the rudiments of the future hairs, which are jointed, and liable to modification with the age of the plant. In the mature or decaying plant, these joints become nearly perfect cones, the base of each being very slenderly attached to the apex of the cone beneath, presenting a very singular appearance. These peculiar hairs, or perhaps glands, must not be mistaken for the parasitical fungus, from which, indeed, they greatly differ.

"The tuber of the potato is cellular, the cells being pentagonal, each containing several starch grains (from 8 to 20), which are oval, and perfectly unconnected with each other. If a tuber be cut and exposed to the sun and air, the cells will, in the process of drying, contract, and force to the surface a layer of starch grains, which have a whitish, crystalline appearance.

"1. *The Disease of the Leaf.*

"The appearances to be described must not be confounded with occasional brown spots and holes, which are obviously the work of

insects, and which do not increase after the marauders have made their meal. The first obvious indication of the disease is a withered, bluish spot, brown in the centre, where the leaf is killed, and rapidly extending, and which always originates on the *under* surface of the leaf. Closer observation discovers a white halo, or mould, around the spot, and this is a certain indication of the total destruction of that portion of the plant above the ground, and also of every tuber which is subjected under favourable circumstances, as moisture, to the infection. I shall by and by prove that this mould is the identical cause of the destruction of the tuber. Under a lens of very moderate magnifying power it has a cottony aspect, and is diffused among the hairs of the leaf, cutting them up and disarranging them, and from it arise very numerous thready, forked stems, having fruit-bearing, oval capsules, which appear to me on a rough calculation to have a long diameter equal to $\frac{1}{3000}$ of an inch, and which, when ripe, shed their seed or sporules, which become, no doubt in myriads, the property of the atmosphere. But the cottony root or spawn, when once produced, appears capable of multiplying itself indefinitely, at least until it has effected the destruction of that on which it feeds. It extends to the stalk upon which the fruit capsules are, under favourable circumstances, most clearly demonstrated.

"Leaves are the lungs or respiratory organs of plants. Soon therefore after the appearance of the leaf-spot, stains appear on the stalks, and are the result of impeded, and then checked, circulation of the sap. In a few days from the first infection, all that portion of the plant above the ground is, as it were by one fell swoop, destroyed. The evaporation of its aqueous vapour is speedily accomplished, and a little carbonaceous and saline matter in the shape of a dead stalk indicates the situation of the tubers, which are found more or less loosely connected with it by decaying attachments.

"2. *The Disease of the Tuber.*

"On digging the tubers it very commonly is observed that one only of a bunch is the subject of the disease, which it has derived either from an infected parent set (or portion first planted), or from the leaves and stalk, and is, I believe, always in the closest approximation to them.

"Much moisture on the tuber renders its surface unfit for microscopic examination, and upon the *dry* surface of the tuber the fungus may not luxuriate, although it has first passed through it on its way

to the interior. It is therefore necessary to obtain a part of the infected potato presenting it in a comparatively dry state, and this is very easy, for on breaking open some specimens, little accidental cavities or fissures present the spawn in all its luxuriance, and it is precisely identical with that above referred to on the leaf, lining the hollows which it has reached. In cavities which are excluded from the air the fruit-bearing stems of the fungus are not thrown up from the spawn, but in favourable spots they are as evident as upon the leaves. In every instance the disease of the substance of the tuber is most obviously in communication with its outer surface; small brown spots, stains, or lines, marking with certainty the route of the infection from without inwards. If a single instance can be adduced of the origin or existence of the disease in the centre of the tuber, independently of this communication with its surface, then this theory and the results of my observations are entirely shaken. In every instance, I have found it advance from the circumference to the centre.

"I have described the stems and oval fruit-bearing heads of the fungus. The cottony ground-work, or spawn, when highly magnified, is found to be composed of jointed or vesicular filaments, infinitely branched, and which, especially upon the cut surfaces of diseased tubers, become heaped together, a white mass being thus formed, bearing a resemblance to snow.

"In cellular plants, as mushrooms, the rapidity of growth is most surprising, and botanists, attempting the calculation, have supposed that many millions of cells are formed in a single hour. I introduce this analogy of the growth of other vegetable formations to reconcile the seeming paradox of the plant under consideration advancing with such frightful rapidity. If a diseased potato be cut in two, and having been laid aside for a day or two, be then examined, the portions of the cut surfaces stained by the infection, will be found covered with a white mould, which is entirely composed of the web-like filaments.

"The inductions and general remarks derived from the investigation are as follow :—

"1. The blight first attacks the leaf of the plant, and originates from invisible germs or prolific particles diffused (perhaps universally) through the air, and which await a favourable opportunity for their development, just as other parasites, whether Fungi or flower-bearing plants, select their own proper soil—thus the mistletoe selects the apple or oak; the *Cuscuta*, or dodder, the wild thyme and furze; a

fungus, above referred to, the pea-leaf; and the spawn of mushrooms certain soils, &c.

" 2. The parasite affects the tuber secondarily, and inoculates it by direct contact.

" 3. Although the fungus bears fruit and seed, yet its spawn is itself capable of indefinite reproduction, and destroys by encroachment, and a specific inherent property.

" 4. Tubers taken from the ground free from infection will not *necessarily* become infected, nor the future plants and tubers.

" 5. Assuming that the atmosphere always contains, diffused through it, these vegetable germs, but generally in a dormant state, then either some atmospheric change congenial to their development may be inferred, or some declension in the potato plant, the result of continual propagation from the original parent sets, the probability of such a result being borne out by the declension of fruits propagated from grafts whose original parent tree has consummated the period of its existence—but observations on seedlings would assist in elucidating this point.

" 6. The dry coat of a tuber is unfavourable to the growth of the fungus, but if, with the assistance of moisture, it has become infected, the disease will extend to the interior, although its surface be afterwards kept dry.

" 7. The most likely mode of preserving the plant for future crops is by carefully separating the healthy from diseased tubers, and applying to their surface some substance, as lime, &c., in order to destroy any part of the fungus which may accidentally have reached them.

" 8. It will be unadvisable to crop the ground extensively with potatoes, especially the varieties which are commonly matured at a late period of the year, until cautious trial and experience shall have proved that the state of the atmosphere or the condition of the plant are unfavourable to the luxuriance of the fungus.

" 9. This fungus appears peculiar to the potato plant.

" Memorandum. — The leaf of the turnip is often extensively affected with a fungus which is intimately allied to the potato fungus, but its effect is evidently only partially injurious.

" It has been stated that the tuber, although checked in its growth, will, even if the leaves and stalks be cut down, mature itself in the ground, but, with great deference to those who have advanced this opinion, I venture to suggest that the healthy life and natural decay

of these important parts of the plant are essential to the perfection of the tuber, which they were, by nature, destined to ventilate and purify."

"July 27, 1846."

Mr. Smee and his Aphis vastator.

In a late number of the 'Phytologist' we noticed Mr. Smee's work on the potato-disease as a pleasant and well-timed *jeu d'esprit*, calculated to arrest, in some measure, the torrent of hypotheses with which the press was at that time teeming on the same subject. As a *jeu d'esprit*, and written with a benevolent intention, it claimed our respect and admiration; but we think the author has subsequently taken up the subject a little too strongly, and we beg to caution him against such advertisements as the following, extracted from Saturday's 'Sun,' lest he unexpectedly find the public laughing *at* him instead of *with* him; an unpleasant difference.

**"IMPORTANT EXPERIMENTUM CRUCIS, OR DIRECT PROOF
OF THE DESTRUCTION OF THE POTATO PLANT BY THE APHIS
VASTATOR.**

"SIR,—In my treatise on the potato plant, I have shown that, antecedently to all other changes, a certain insect is to be found on the leaf, which sucks the juices of the plant and causes it to die, locally, at the part affected, or generally through its entire system.

"By tracing the insect to numerous other plants it was found to produce similar effects—the turnip rotted in the bulb, the carrot in the root, and even the indestructible groundsel equally suffered from its attacks. In the damaged plants anatomy demonstrates imperfect tissue—chemistry, a deficiency of the solid materials, and natural history indicates the source of the mischief by pointing to the creature which abstracts that which should form the fibre and starch of the plant.

"To those who prefer experiment to observation I have now to announce that at length the direct proof of the capability of the *Aphis vastator* to destroy the potato plant has been obtained; an experiment which has already been performed with the same result upon tulips, crocuses, and other plants.

"Several Russian tubers, apparently sound and well filled with

starch, were planted in a greenhouse, and thoroughly healthy plants were produced. Upon one of the best of the number, when about two feet high, was placed a colony of vastators, which fed and thrived abundantly, and which were prevented from travelling to neighbouring plants by a covering of gauze.

"For a time, this plant thrived as well as its neighbours, but eventually the entire haulm died and withered up, as was observed last year in the blighted fields. Its neighbours, which had no insect to suck the vital fluid, were perfectly healthy, forming a striking contrast to the withered and dead stalk.

"On examining the collar it was found partially decayed in the manner which I have described as being especially attributable to the ravages of Aphides. The roots were found to be extensively rotten, and the little tubers, although not one-sixth the bulk of the original set, presented a hardness characteristic of disease.

"The ærial and fungoid theorists have striven hard to divert the attention of the farmer from the ravages of the vastator; and in the unparalleled virulence of their opposition, they have even frequently substituted acrimony and mis-statement for courtesy and truth. Nevertheless, no scientific man in any country has ever disproved my statements, or confuted my deductions; and if amongst practical men there be one still left who doubts the destructive power of the vastator, I beg him to consider deeply and repeat this experiment, that all being of one mind we shall not be diverted upon matters which are irrelevant, but shall be enabled to concentrate our energies in the annihilation of the destroyer, and the protection of our crops. —I am, Sir, your obedient servant,

"ALFRED SMEE."

"7, Finsbury Circus,
April 19, 1847."

We trust that the 'Phytologist' has not a reader so stolid as to swallow so evident a hoax as this vastator affair appears to be. If there be, let him peruse Mr. Smeë's numerous letters in the public papers, and he will find that gentleman very frequently speaking of botanists, entomologists, gardeners, &c., as though a knowledge of botany, entomology and horticulture were disqualifications for bringing the inquiry to a successful issue: surely this cannot be in earnest! surely no surgeon would say, as a matter of self-gratulation, "the anatomists are all against me, but I care nothing for that, I have hypotheses that

bid defiance to anatomy!" If this language be logical, then Mr. Smee's book is logical, and all his letters are logical: but if a knowledge of anatomy is necessary to the surgeon; if the structure of a watch should be known to the watchmaker; if the ingredients of beer should be known to the brewer; so is a knowledge of physiological botany necessary to the writer on the nosology of plants; so is a knowledge of entomology needful to those who detail the doings of insects; so is a knowledge of horticulture essential to those who take the subject of cultivation. Let us recommend Mr. Smee to carry his witticisms a step farther; let him suggest to the public the advantage of a galvanic wire drawn over the potatoes by a couple of Irishmen, one at each side of the plantation; and let him issue a polite circular to the vastators, begging them to come to the wire and be killed.

K.

"Remarks on Double-cropping, as a Means of lessening the Risk of Growing Potatoes. By JOHN S. ENYS, Esq."

(Extracted from the 14th Annual Report of the Royal Cornwall Polytechnic Society).

"IN consequence of the second failure of the potato crop, it is probable many persons will be deterred from planting their accustomed quantity of potatoes; and hence, exclusive of the anticipated continuation of the disease, a deficient supply from a less extent of land planted with potatoes may be apprehended.

"Under these circumstances no apology I trust will be deemed necessary for bringing before this meeting a suggestion for lessening the risk of a total loss, by growing potatoes in alternate rows with another crop, with a view that in case of the occurrence of the potato disease in 1847, the increased growth of the second crop may in some degree compensate their loss.

"The expectation of a greatly increased produce from double crops has, I apprehend, been but seldom realized; and the plan is open to objection, from the greater cost of hoeing, and trouble in separating, the produce.

"Market gardeners, however, often remove one of such crops for consumption, leaving the other to stand as the principal crop. A failure of alternate rows of potatoes, if planted in this mode with

another crop, would be analogous to their removal ; and if our expectations were limited to the increased growth of the other crop, the plan would become, in a great degree, an assurance against total loss.

“Considering beans* an uncertain crop in the climate and soil of Cornwall, I have for the last two years grown beans with an insurance crop under them in alternate rows, and the success has been sufficient to induce me to extend the practice, and to double the bean crop in 1847, and adopt the same principle in growing potatoes.

“A different standard may be required of the width of the rows, in different soils and for different varieties of potatoes. The standard I have generally adopted is 27 inches in single crops, and from 18 to 20 inches in alternate rows of different crops.

“The plan of planting a second crop on land in which potatoes have failed, is not practicable on a large scale in the midst of turnip hoeing or harvest. The land can be seldom found in good order for this purpose, even if the time for planting the second crop should not be past, while the plan of double-cropping may be readily carried out to any extent at the proper season, and the secondary crop will be ready to grow immediately on the failure of the principal.

“The crop that is considered of the least importance can always be kept back to allow of the more free growth of the principal, but no reasonable expectation ought to be entertained of a greatly increased joint produce from double crops ; still, under the present circumstances of the potato-disease, I conceive it may prove useful if our views are limited to the expectation of an increased growth of one crop compensating the deficiency of the other, in case of a failure from any cause affecting its growth.†

“The comparative experiment, in 1846, was made fairly. The winter beans and potatoes (large white) were all planted on the last day of February, in a clover lay, double ploughed, and manured in the rows with 3 cwt. of guano per acre.

“In 1845 the tick beans and potatoes (large white) were planted in the last week of March, after oats, and manured by 3 cwt. of guano ; and the produce of the potatoes, under the beans, was much larger, per acre, than the same variety sown several weeks later.

* See Lord Lovelace's account of bean crops, with an undercrop of cabbages. English Agricultural Society's Report, 1844.

† In this place two tables are introduced to illustrate the author's experiments, but unfortunately are so arranged in the printing as to be perfectly unintelligible.—Ed.

"In both these cases, the beans were considered the principal, and the potatoes the secondary crop; and, in 1845, the latter were twice trodden down by a boy, to prevent their interfering with the blossoming of the bean crop. In case the potato is considered the main crop, carrots especially, or even mangel wurzel, or cabbages, would be preferable in the alternate rows, as the insurance or secondary crop.

"At the time these remarks were read at the Polytechnic meeting, the potato crop of 1846 had not been measured; and they thus were founded on the result obtained from the crops of 1845. The stems of both crops were destroyed by the disease; but the tubers were much less injured in 1846 than 1845: in both years the injury was below the average."

Notice of 'Species Filicum; being Descriptions of all the known Ferns, particularly of such as exist in the Author's Herbarium, or are with sufficient accuracy described in Works to which he has had access; accompanied with numerous Figures. By SIR WILLIAM JACKSON HOOKER, K.H., D.C.L., F.R.S., V.P. L.S., F.A.S., &c., Director of the Royal Botanic Gardens of Kew.' Vol. I., containing Gleichenia—Dictyoxylum. Plates I—LXX. London: Pamplin. 1846.

THE entire range of literature offers no subject more intensely interesting than a general illustrated history of ferns. The extreme beauty of the plants themselves, the ease with which they are now cultivated, the impetus and *ton* given to their cultivation by the introduction of Mr. Ward's cases in the drawing rooms of the nobility and gentry; the easily understood distinction of species; the aptness of the objects for characteristic and graceful illustration; these, and many other causes combine to render a 'Species Filicum' the most tempting book which a competent author or speculative publisher could possibly undertake, and to promise an equal fund of amusement, instruction, renown, and profit: a return of *quid pro quo* to all parties concerned, a mutual harvest of satisfaction.

Sir William Hooker's deservedly high reputation considerably enhanced the eager expectation with which the appearance of the first part was awaited: through a series of works and during a long course of years, the learned author has maintained a botanical reputation

that few of our countrymen have reached, and of which scarcely one has lived to enjoy the full fruition and reward.

Add to this the author's office as a principal manager of the Royal Gardens at Kew, where Mr. Smith, the first pteridologist in the country, has laboured so long and so successfully in making collections both of living and dried ferns, and we must acknowledge that the 'Species Filicum' comes before the public with every advantage that circumstances can bestow.

The first point of interest attached to the publication of a work on ferns by so celebrated a writer, was the arrangement to be adopted. It was a matter of great curiosity with botanists to know whether the laborious researches of Presl and John Smith would be availed of, the obsolete system of Swartz and Willdenow revived, or a new method more comprehensive and convenient than either be raised as a superstructure on the united bases of both, combining the merits of both, and dismissing the errors of both. No such opportunity has ever before existed: the author, as he himself asserts, had "the power of examining the almost countless specimens, preserved either in his own peculiarly rich herbarium, or in the many others, as well public as private, to which he has been allowed access. The opportunities thus afforded * * * have proved of the utmost utility; they have enabled him to arrive at results to which no other means of investigation could have led."

From this quotation it will be evident that our high estimation of the author's capability is by no means superior to his own, but whoever peruses the preface, although perhaps fully participating in the author's ideas of his own advantages, will have cause to regret that he should have gone out of his way to point out the very trivial errors of fellow-labourers: we do not say that they are not errors, but they have scarcely any connexion with what Sir William has before him; and it therefore appears uncourteous and unkind to drag them before the public. We heartily wish that the pages occupied by this preface had been devoted to the more legitimate object of giving a synoptical table of the author's own views: Sir William Hooker is too fond of exhibiting what appears to us uncalled-for jealousy; uncalled-for, because his own great acquirements can afford that he should give to every labourer in the field of science his just modicum of praise, without restricting it to those who are dead to the public if yet alive in the body, who can never enter the field of literature as competitors with himself. Throughout the preface not a word occurs explanatory of the arrangement about to be adopted,

and we have been at infinite pains to extract the following synopsis from the pages of the work itself:—

ORDER I.—FILICES.

SUBORDER I.—GLEICHENIACEÆ.

[GENUS] 1.—*PLATYSOMA*, *Br.*

[GENUS] 2.—*GLEICHENIA*, *Br.*

Subgenus I.—*Eugleichenia*.

Subgenus II.—*Mertensia*.

§ I. Stipes forked, branches bipinnate.

§ II. Fronds dichotomous (rarely simple) pinnatifid: in other words the leafy portion is not confined to the forked apices, but is decurrent more or less upon the branched portion of the stipes.

§ III. Stipes simple, and bearing simply forked pinnæ; or dichotomous, the branches zigzag, bearing alternate branchlets, each with simply forked or only one pair of pinnæ. Segments never decurrent.

§ IV. Stipes repeatedly di- or trichotomous, the ultimate branches bearing simply forked pinnæ: a pair of pinnæ also arise from the base of the di- or trichotomy of the branches (not of the frond). Segments never decurrent.

SUBORDER II.—POLYPODIACEÆ.

TRIBE I.—CYATHEÆ.

[GENUS] 1.—*CYATHEA*.

Subgenus I.—*Notocarpia*.

Subgenus II.—*Eucyathea*.

[GENUS] 2.—*HEMITELIA*.

* Fronds pinnate.

** Fronds bipinnate or decomposed.

[GENUS] 3.—*ALSOPHILA*.

Subgenus I.—*Metaxya*.

Subgenus II.—*Trichopteris*.

Subgenus III.—*Eualsophila*.

§ I. Sori with a spurious involucre at the inner base.

§ II. Sori destitute of involucre, or so minute as to be wholly covered by the sorus, and with difficulty observed.

TRIBE II.—DICKSONIÆ.

Subtribe I.—Hypoderridæ.

[GENUS] 1.—HYPODERRIS.

Subtribe II.—Woodsiæ.

[GENUS] 2.—SPHÆROPTERIS.

[GENUS] 3.—DIACALPE.

[GENUS] 4.—ARACHNOIDES.

[GENUS] 5.—WOODSIA.

Subgenus I.—Physematium:

Subgenus II.—Perrinia.

Subgenus III.—Woodsia vera.

Subtribe III.—Eudicksoniæ.

[GENUS] 6.—THYRSOPTERIS.

[GENUS] 7.—DICKSONIA.

Subgenus I.—Balantium.

Subgenus II.—Patania.

(Ultimate divisions or pinnae large, more than an inch long).

(Ultimate divisions or pinnae small, less than an inch, generally much smaller).

[GENUS] 8.—CIBOTIUM.

[GENUS] 9.—DEPARIA.

[GENUS] 10.—LOXSOMA.

[GENUS] 11.—HYMENOPHYLLUM.

* Fronds undivided, dichotomous, or once pinnatifid, glabrous.

** Fronds compound, pinnate, or twice or more pinnatifid, hairy or ciliated, entire, or rarely indistinctly denticulate.

† Fronds pinnatifidly divided.

†† Fronds primarily especially below pinnately divided.

*** Fronds decomposed, the margins toothed or serrated, not hairy nor ciliated.

- † Fronds pinnated, especially below.
- †† Fronds pinnatifidly divided.
- **** Fronds decomposed; margins entire (not hairy nor ciliated).
- † Fronds pinnatifidly divided.
- †† Fronds pinnately divided.

[GENUS] 12.—TRICHOMANES.

Subgenus I.—Hymenostachys.

Subgenus II.—Feea.

Subgenus III.—Eutrichomanes.

- * Fronds entire, lobed or digitate.
 - † Veins radiating from the base or flabellate, dichotomous, rarely and only very partially reticulated. Caudex creeping.
 - †† Fronds with a central costa or rib, pinnated with simple or dichotomous oblique veins.
 - ††† Fronds with only a solitary central vein or costa in each segment.
- ** Fronds pinnatifid in [two species] almost bipinnatifid.
- *** Fronds throughout pinnatifidly divided, decomposed; *i. e.* twice or more pinnatifid. (Fronds erect tufted. Caudex creeping but short or none. (Fronds remote, from an elongated creeping caudex).)
- **** Fronds simply pinnated. Fronds tufted. Caudex short creeping or none. (Caudex elongate creeping).
- ***** Fronds pinnated or bipinnate, the pinnæ or pinnules pinnatifidly decomposed. Fronds tufted. Fronds from an elongated creeping caudex.

TRIBE III.—DAVALLIÆ.

[GENUS] 1.—DAVALLIA.

Subgenus I.—Humata.

- * Fronds simple entire, or, the fertile only, sinuated.
- ** Fronds pinnatifid, the lower segments bipinnatifid, rarely pinnated.

- *** Fronds subternate and pinnatifid or bitripinnatifid.

Subgenus II.—*Leucostegia*.

Subgenus III.—*Prosaptia*.

Subgenus IV.—*Eudavallia*.

- * Fronds small ternate or quinate.

- ** Fronds decomposundly divided.

Subgenus V.—*Saccoloma*.

Subgenus VI.—*Odontoloma*.

- * Simply pinnate.

- ** Bipinnate, pinnules entire or only lobulate.

- *** Bipinnate, pinnules deeply pinnatifid.

Subgenus VII.—*Microlepia*.

Subgenus VIII.—*Cuneatæ*.

- * Fronds not scandent, unarmed.

- ** Fronds very long, scandent, spinous.

Subgenus IX.—*Darcoides*.

[GENUS] 2.—*CYSTOPTERIS*.

TRIBE IV.—*LINDSÆEÆ*.

[GENUS] 1.—*LINDSÆA*.

Subgenus I.—*Eulindsæa*.

- * Fronds simple.

- ** Fronds pinnate.

† Costa excentric or marginal, or obsolete. Sori on the superior margin of the unequal pinne.

†† Costa central. Sori on both margins of the equal pinne.

- *** Fronds bi-tripinnate (in some states only pinnate) or decompose.

(Costa excentric or marginal or obsolete. Sori on the superior margin of the unequal pinne).

Subgenus II.—*Schizoloma*.

- * Fronds simple or only lobed.

- ** Fronds pinnate (or, when young, simple).
 † Costa central. Sori on both margins of
 the nearly equal pinnæ.
 †† Costa excentric marginal or obsolete.
 Sori on the superior margin of the
 unequal pinnæ.
 *** Fronds bipinnate or decomposed.

[GENUS] 2.—DICTYOXYPHIUM.

The author appears to congratulate himself on having, by means of the tribes, subtribes, genera and subgenera, sections, asterisks, daggers, parentheses, &c., avoided the errors of "Dr. Presl and Mr. John Smith, who," he declares, "have showed themselves peculiarly addicted to multiplying genera, have not always taken Nature for their guide, nor succeeded in eliciting a simple and tangible arrangement." We are therefore compelled to believe that the author considers the foregoing "a simple and tangible arrangement," and that starred and daggered sections, founded on the characters of "pinnately" or "pinnatifidly divided," "pinnæ more than an inch long," "pinnæ less than an inch long," and similar distinctions, are really to supersede the elaborately described characters of fructification and venation given by the authors above mentioned; for he expressly says at p. 144, that "the variations of form in the involucre or indusium is more useful as affording specific, rather than generic characters." Can Sir William Hooker be serious in this? Is not his object rather to apologize for not using the fructification in his multitudinous divisions, than to enforce the superiority of a method long since exploded, although carried out with considerable ingenuity by Withering, and the botanists of his day? Had Sir William taken the third volume of Withering in his hand, and turned to the genus *Polypodium*, divided exactly on the plan he now proposes, we think he could not fail to have pencilled certain commentaries against the species as they stand. We give Withering's synopsis in roman, and the commentator's supposed pencillings in italics.

"GENUS POLYPODIUM.

"§ I. Leaves wing-cleft.

"*P. vulgare.*" *A Polypodium, W. J. H.*

"§ II. Leaves winged.

"*P. Lonchitis.*" *A Polystichum, W. J. H.*

"*P. Ilvense.*" *A Woodia, W. J. H.*

"*P. Cambricum.*" *A Polypodium, var. only, W. J. H.*

- " P. Phegopteris." *A Polypodium*, W. J. H.
 " P. Oreopteris." *A Lastræa*, W. J. H.
 " § III. Leaves winged ; wings deeply wing-cleft.
 " P. Filix-mas." *A Lastræa* ? W. J. H.
 " P. Thelypteris." *A Lastræa*, W. J. H.
 " P. dentatum." *A Cystopteris*, W. J. H.
 " P. fontanum." *An Asplenium*, W. J. H.
 " § IV. Leaves doubly-winged.
 " P. aculeatum." *A Polystichum*, W. J. H.
 " P. spinulosum." *A Lastræa*, W. J. H.
 " P. Filix-fœmina." *An Athyrium*, W. J. H.
 " P. cristatum." *A Lastræa*, W. J. H.
 " P. fragile." *A Cystopteris*, W. J. H.
 " P. trifidum." *A Woodsia* ? W. J. H.
 " P. rhœticum." *An Athyrium*, W. J. H.
 " § V. Leaf triply winged.
 " P. Dryopteris." *A Polypodium*, W. J. H.

We could analyze many of Sir William Hooker's divisions with a similar result, particularly his genus *Hymenophyllum*, which is made to comprise a family of ferns separable into generic divisions by characters of surpassing distinctness derived from the fructification. Sir William divides this group precisely on the same plan as that adopted above by Withering in *Polypodium*, the result is of course the same, that of dissevering allied species, or even varieties of the same species, and of associating species that have no characters in common, except the mode in which the frond happens to be divided, a character we might describe as being totally unavailable.

It would appear from the author's own statement that when he wrote this part of the work he was unaware of Presl's admirable Monograph of the family ; for in Part II., which appeared in 1844, this monograph is not mentioned, although it had been nearly two years before the public, and therefore this want of knowledge seems unaccountable and inexcusable: however, immediately after the publication of Part II. of the 'Species Filicum,' a complete analysis of Presl's work appeared in the pages of the 'Phytologist;' then, the *Hymenophyllaceæ* being still unfinished, it became necessary to notice Presl's labours, which is accordingly done in Part III, and a Synopsis is given, preceded by the remark we have already quoted as objecting to generic characters being derived from the fructification. To those who are not pteridologists any comments on the labours of these two authors would be unintelligible, to those who are pteridologists we would suggest a comparison of the two systems.

We cannot but regret that any author should venture to risk a well-earned reputation by carelessness like that we have noticed ; or to palliate carelessness by remarks, which, to speak in the mildest way, will find no response amongst scientific botanists. At the present day, when the fructification, the venation, the scales of the stipes, and every part of the plant is laboriously studied, and when the fructification and venation have been shown to afford such excellent characters for the discrimination of divisions, we cannot be expected to revert to a character *often* insufficient for ascertaining a variety, and *never* available for a higher distinction than that of species.

L. S. T.

Notice of a 'Manual of British Botany. By CHARLES CARDALE BABINGTON, M.A., &c.' Second Edition.

THE former edition of this work was good—very good. If the use of a comparative term can be allowed after the superlative, this second edition is *better*. Various small blemishes have been expunged ; and occasional inaccuracies of the former edition are here rectified. Some unsuccessful attempts at originality, in framing the descriptive characters, have now given place to more sound views and observations ; which have been taken from other sources, indeed, but which apparently have not been adopted without due examination. Among other emendations, we may rank the omission of that trader-like puff of the author's own wares, mingled with insinuations against the works of preceding authors, which disfigured the Preface to the former edition.

On glancing through the volume we do not find much that will be new to readers of the 'Phytologist.' The plants which have been discovered or recorded for British, since the publication of the prior edition, are duly entered in their appropriate places ; but as almost all of these have been already registered in the pages of the 'Phytologist,' they are not novelties to our own readers. Some dozen or so of additional species are either waifs and stragglers from cultivation, as *Lepidium sativum* and *Asperula taurina*,—or species not yet sufficiently ascertained, as *Viola epipsia* and *Foeniculum piperatum*,—or subdivisions of familiar species, as *Zostera nana* and *angustifolia*, separated from *Zostera marina*. A little farther extension is likewise made of a good

plan commenced in the first edition ; namely, the occasional mention of species which are deemed likely to occur in this country, although they have not yet been ascertained to grow in the British Islands. In some very few instances, too, the author has even retraced his own steps, by re-uniting supposed species which he had before divided, or again separating those which he had formerly combined into one. It may be presumed that the evidence was very conclusive and undeniable, which compelled our present author to take these courses, especially that of re-union. As instances of re-union, we may refer to *Teucrium Scordium* and *Scordioides*, to *Hieracium boreale* and *sabadum*. And as examples of subdivision, we find Newman's three species of *Lastrea* (*recurva*, *multiflora*, *spinosa*), substituted for the *L. dilatata* of the former edition, although under other names ; also in the genus *Polystichum*, we have the *angulare* again separated from the *aculeatum*, the *lobatum* being retained as a variety of the latter. As might have been anticipated, there appears most re-modelling in the genus *Hieracium*.

Whichever edition we take, the Manual is certainly a work of standard value, either for the use of the student who wishes to learn the names of plants, or for the use of those botanists who would institute comparisons between the botanical productions of Britain and those of other European countries. Its own intrinsic merits and moderate price will ensure its success in the book-market, especially if the author keeps up to his prudent practice of lauding the lecturers who can use it in their class-rooms and recommend it to their pupils. For our part, we have no objection to make against the employment of a little "worldly wisdom" in this instance : it can only increase the sale of a work which well deserves to be sold.

Indeed, we consider it a fortunate circumstance that this very necessary department of British Botany has been taken under the control of an individual who possesses such a combination of natural and adventitious qualifications for the office of descriptive botanist. Evidently deriving from nature a matter-of-fact cast of mind, adapted to minute observation and detail, and not diverted therefrom by any great tendency to imagine or to reason, the author is admirably fitted for the good execution of a task, which turns chiefly upon the attentive examination and comparison of small physical differences. Individuals of comprehensive mental grasp, especially the imaginative and reflective, cannot submit to the patient drudgery of examining those innumerable petty details which the technical describer of plants must make himself familiarly acquainted with. Success in this depart-

ment of science, as in any other, acquires a talent from nature, as well as study; albeit the talent is widely different in kind from that which makes a Humboldt or a Combe.

In addition to a natural fitness for the scientific path which he has chosen to take, the author of the *Manual* has enjoyed several adventitious advantages which have not fallen so favourably to the lot of any previous describer of British plants. Among these we may fairly reckon the leisure which is afforded by an entire freedom from professional and domestic ties, frequent and extensive travel about the British islands, greatly increased facility of intercommunication with other botanists by rail and post, the recent publication of various other descriptive and pictorial works of high merit, together with access to a vast number of ready-labelled European specimens, whether sent originally to the author himself, or to the Botanical Society of Edinburgh, which is perhaps much the same thing in practical usefulness to him. The last advantage can scarcely be estimated too highly. We make no doubt that his identifications of species, and corrections of nomenclature, have frequently been thus suggested to our author; and that the accuracy and value of the *Manual* have been greatly increased thereby. In this, there is no detraction from his merit as a scientific writer. He has not only had unusual advantages within his reach, but he has also known how to use them,—to make them available to his own object, serviceable to others, and conducive to the promotion of science.

The true character of the *Manual*, however, appears to have been imperfectly understood by reviewers and critics. In a certain sense, it really was a new work, as somewhat ostentatiously pronounced to be; and yet it exhibited little of originality in conception or of novelty in execution. It might almost have been termed, 'Koch's Synopsis, adapted to the botany of the British Islands, with variations and additions from other sources.' It is, and was from the first, an excellent critical digest of the descriptions and nomenclature of British plants, as set forth in the works of Continental and British authors, and verified by comparison with the plants themselves. In some instances, indeed, the author substituted fresh characters for species, on the faith of his own examinations only; but, as before hinted, these attempts at novelty have sometimes proved less sound or successful than his critical compilations. Nor is there anything to excite surprise in this. Little room could remain for novelty in the descriptions of plants which had been described before, and most of them described a hundred times over.

It may be thought that we use rather eulogistic terms, in thus strongly commending a work which, as is admitted, relates only to one of the more humble departments of botanical science. We believe, however, while it certainly makes only small demand on the loftier powers of mind, that the good execution of such a work does truly require a considerable share of intellectual talent, although such talent may be of a partial or specific kind. Moreover, descriptive botany is a most essential department of the science; and some of the highest investigations towards which the attention of botanists can be directed will be found to depend pretty much upon the ability and accuracy of those who devote themselves to technical description. We believe that exactness in description and nomenclature will continue to become of increasing importance to the general progress of the science.

Turn we now to the other side of the picture, and say a few words on some points where we must think the author fairly liable to a share of censure. Here and there, through the volume, we detect such decided evidences of partiality as to leave us no means for avoiding a conclusion that the author adopts or rejects genera and species, names and characters, less on their own merits and soundness, than out of personal feelings towards (whether *for* or *against*) the botanists by whom they may have been suggested or ascertained. For instance, it looks not well to find an untenable species retained, as if it were something real in nature, when it happens to have for its authority the name of a botanist influential by his social position, and capable of conferring favours; while, on the other hand, a not less tenable species is rejected, which happens to have been proposed by some less influential person, or by a botanist who is no longer among the living. Neither does it look well to find a marked abstinence from references to writings which might show himself to have been formerly in error, or which might prove advantageous to some independent institution or individual botanist who is no favourite with the author of the Manual. And when this sort of personal partiality or prejudice is carried so far that error, shown to be such on sufficient evidence, is repeated in preference to the substitution of fact or truth, it can hardly fail to excite a distrust of the author's scientific fidelity, and must unavoidably weaken the reliance which otherwise might have been given to the Manual, as a faithful record of the realities of nature. Not a worse, but a more direct and unmistakeable breach of justice is committed in misappropriating to himself any little discovery or correction of nomenclature, in which he must well know that he had no share. This want of sufficient impartiality, in matters that should be

purely intellectual or scientific, is the chief defect of the Manual ; and although too evident in some particular instances, we would still not be understood to imply that it pervades the work generally and as a whole. If called upon to do so, we will give examples in illustration of the alleged defect. Unless so called upon, we shall avoid a course which would compel us to name the botanists, towards whom, as appears to ourselves, an undue subserviency has been evinced, or the opposite conduct exhibited.

Having premised these observations on the general merits and character of a book which may be considered a publication of much importance to the British botanist, we shall now take a run through its pages, in order to select therefrom some of the more novel items which may appear most likely to interest readers of the 'Phytologist,' or which may offer matter for comment.

Under the head of *Thalictrum minus* we find a suggestion that *T. flexuosum* (*Reich.*) is likely to prove a native of Britain ; also, that the plant on the rocks, near Twll du, in Caernarvonshire, hitherto reported under the name of *T. minus*, is probably *T. Kochii* (*Fries*). *Fries* gives long descriptions of all three in his recent work, 'Summa Vegetabilium Scandinaviæ,' from which it appears that *T. minus* has eight-ribbed carpels, while those of the other two alleged species are ten-ribbed ; *T. Kochii* having its stem hollow, straight, smooth, naked ; *T. flexuosum* having the stem solid, striated, leafy at the base ; the stems of *T. minus* being solid, flexuose, striated, and leafless at the base.

Under the head of *R. aquatilis* the author intimates that probably two species (exclusive of *circinatus* and *fluitans*) are comprehended under that name. The one, *Batrachium heterophyllum* (*Fries*), is to be distinguished by its leaves having dentate or incised lobes, and its flowers growing from the axils either of the submersed or the floating leaves. The other, *B. peltatum* (*Fries*), is to be known by the cordate or truncate base and crenate lobes of its subpeltate, floating leaves, with flowers from the axils of those floating leaves only. Thus far our author appears to have taken the distinctions from *Fries* ; but he farther says, "Often the floating leaves are wanting in the former ; never in fertile plants of the latter." It is not easy to see how the floating leaves could be wanting in *fertile* (that is, in *flowering*) plants of a species, whose flowers are produced from the axils of those leaves only ! We before remarked that the author of the Manual had no great tendency to imagine or to reason. If he will again read the remarks of *Fries*, he may see that the short sen-

tence above quoted just reverses the statement of Fries, and utterly destroys its logical propriety by doing so. We have specimens from Surrey, Lanarkshire and Aberdeenshire, which possibly may belong to the *B. peltatum*.

Ranunculus Lenormandi (*F. W. Schultz*) is adopted of a species, and the variety "grandiflorus" of the former edition is quoted as a synonym, although there is a discrepancy which we cannot reconcile therewith; namely, the alleged "broad" petals of grandiflorus; for those of *Lenormandi* are so narrow in proportion to length, as to give a radiate or starry appearance to the flower. The normal condition of *Lenormandi*, like that of *aquatilis* or *hederaceus*, is floating; its stems are creeping where left dry. The contrast with *hederaceus* is too strongly drawn, in comparing the relative length of calyx and petals; for those of *R. hederaceus* frequently, if not usually, exceed the calyx, and are sometimes full twice as long.

Barbarea arcuata (*Reich.*) is cashiered from its rank as a species and reduced into a variety of *B. vulgaris*. We presume that the characters of distinction, drawn from the different shape of the seeds, in the former edition, were found erroneous, as they are not repeated. The specific character of *B. vulgaris* is expressed in such manner as to convey a totally different meaning from that which is intended. In the Manual it runs thus: "lower leaves lyrate: upper pair of lobes as broad as the large roundish subcordate terminal lobe." Such is not the fact; the upper lobes being less than half as broad as the terminal lobe. The *length* of the upper lobes, measured from tip to tip, across the leaf, equals the *breadth* of the terminal lobe; and the author should therefore have written, "upper pair of lobes equalling the breadth of the terminal lobe." The character is taken from Koch's Synopsis, but so translated as to change that author's meaning, and to state the fact incorrectly.

Erysimum cheiranthoides and *E. virgatum*, in the former edition, were alike marked as species "possibly introduced, but now having the appearance of being a true native." We think it was the author of the Manual himself who caused the introduction of *E. virgatum* into lists of British plants: and it may therefore be worth while to observe that, in the second edition, *E. cheiranthoides* is given as a true native, while *E. virgatum* is to be expunged from our catalogues, being no longer found about Bath, and having been "probably introduced accidentally." It is doubtless at times a matter of nice judgment to decide whether a newly observed species should be received or rejected in our lists of native and naturalized

plants; but as no mischief can arise from hesitation, it is surely better not to be in such haste to swell our catalogues by the introduction of temporary stragglers, which thus shortly disappear again.

"I have reason to think," writes the author, "that an imperfect specimen of *Viola* from the island of N. Uist, Scotland, is the *V. epipsia* (*Led.*) Fries, which has short peduncles, longer free stipules, and cordate adpressed dentate leaves." Our herbarium has a specimen from Dalwhinnie, which may be this species.

In the genus *Cerastium* we find the *atrovirens* and *pumilum* still retained for species distinct from *semidecandrum* and *tetrandrum*. The two latter are very bad names, because at variance with fact; and while continued they will lead to frequent errors. Cosson and Germain use the name "varians" to comprehend this group of "varieties" and "sub-varieties." In the alpine species of the genus the author of the Manual has retraced his steps, by again separating the *alpinum* and *latifolium*, and placing Edmonston's *nigrescens* as a variety of the latter, instead of being its typical and sole representative in Britain. Of the propriety of separating the Highland *alpinum* and *latifolium* we are fully confirmed by cultivation for several years, and repeatedly raising them from seed. But it is true, also, that Edmondston's *C. nigrescens* has come up so exactly identical from seed, that branchlets of the offspring and branchlets of the parent plant are undistinguishable after removal from the growing plants. Still, there seems no clear character for a book-distinction between the *nigrescens* and *latifolium*.

In treating the species of *Hypericum* we are informed by our author, on the authority of Reichenbach, that *H. grandifolium* (*Chois.*) grows in Arran, Scotland. We should deem the presumption very strong indeed against the occurrence of this shrub as a native of Arran, Scotland. The Irish isles, so named, may be rather less unlikely, though still not to be deemed likely. Some uncertainty attends the nomenclature of *H. grandifolium*, however, and Reichenbach may intend something different from the *Androsæmum Webbianum* (*Spach*) or *Hypericum foliosum* (*Ait.*) under that name. The last-named species is almost as tender as a *Fuchsia*; its stems being killed to the ground by the ordinary winters of England, though we have seen them survive through mild seasons, like the winter of 1845-6. *Hypericum barbatum* is retained among the undoubted natives, as is the case with many other pretendedly British plants; for example, *Rubus arcticus*, *Sedum sexangulare*, *Echinophora spinosa*, &c.

The *Oxytropis uralensis* of English authors is now named *O. Halleri* (*Bunge*), on grounds quoted in the words of Koch, "*Planta uralensis ab europæa differt.*"

The remark to the effect that the *Eryngium* from the banks of the Tyne is specifically different from *E. campestre* is omitted now; and under "*E. campestre*" the author says, "I am indebted to Mr. James Storey, of Newcastle-upon-Tyne, for specimens from Friar's Goose, which are referrible to this species."

The name of "*Cenanthe peucedanifolia* (*Poll.*)" is still retained for the species so named by Smith. It has been distinctly stated in the '*Phytologist*,' by an eye-witness of the fact, and in a paper which has been seen by the author of the Manual, that the fruit of Smith's plant is subcylindrical in form, and has the callous base obvious even before maturity (*Phytol.* ii. 14 and 15). Nevertheless, he quotes a description of the fruit, which we can apply only to a very immature stage, and adds, "Many authors refer the English plant to *Ce. silaifolia* (*Bieb.*), which has an enlarged callous base to its fruit, according to Koch and Grisebach." The author of the Manual did not dare to contradict the description which assigns a callous base to the fruit of the English plant, but he passes it by unrecognized, and makes a statement which implies a denial. We could adduce other instances of this sly mode of virtually, without actually, contradicting the statements of other observers when at variance with views put forth or descriptions given by himself on insufficient data.

Fœniculum piperatum (*Ten.*) is reported as a doubtfully British species; and the habitat of St. Aubin's Bay, Jersey, assigned for it, on the authority of the Rev. W. W. Newbould. The author of the Manual still queries the specific identity of the wild and garden plants designated by the name of *Fœniculum officinale*, on the ground of differences in the segments of the leaves, which are "awl-shaped" (Hooker), or "capillary" (Babington). We have seen plants with awl-shaped segments around an older plant with capillary segments, and to all appearance produced from the seeds of the latter.

Valeriana sambucifolia (*Mik.*), which was alluded to in the preface to the '*Phytologist*' for 1846, appears as a true "species universally adopted on the continent." The author quotes Fries to this effect: "*E seminibus educta characteres indicatos bene servat, quare ut speciem agnoscere cogimur.*" We cannot, however, allow the conclusive sufficiency of the argument when thus put. The test of hereditary descent is valuable chiefly for showing forms which are *not* genuine species; that is to say, when the seeds of one alleged species

produce plants which bear the characters of another species, we may safely enough give our verdict against the specific distinctness. But as many varieties, even very trifling varieties, are repeated from generation to generation, the simple fact of seeds reproducing only the parent form, is by itself an insufficient evidence of *specific* distinctness in that form. We have above instanced the case of *Cerastium nigrescens* (*Edmondston*), which the author of the Manual now considers a variety of *C. latifolium*, although this latter species or form has not yet (that we know of) been produced from the seeds of *C. nigrescens*, nor the *C. nigrescens* from seeds of *latifolium*.

Anthemis anglica (*Spr.*) is stated to have been re-discovered at Sunderland, by Mr. James Backhouse, in 1844. But Mr. W. Wilson's locality of Bearhaven, Ireland, is passed over to *Anacyclus radiatus* (*Lois.*), which is not adopted as a true British, or rather Hibernian species.

The *Gnaphalium supinum* of the Highland mountains was re-named "*G. pusillum* (*Hænke*)" in the first edition; the former name being still retained for some supposed other species. In the present edition the old name is resumed for the well-known Scottish plant, and the supposed second species cashiered into something unknown. We have seen Mr. Shuttleworth's Swiss plant, to which that experienced botanist applies the name of *G. supinum*. It is not quite like any of our Scottish specimens; but we fail to distinguish it therefrom as a species. Differences of age and luxuriance appear to account sufficiently well for the alleged distinctive characters.

Our author appears inclined, with other botanists, to degrade *Carduus Forsteri* from specific rank on the ground of hybridity. Its extreme scarcity, and non-production of fertile seeds, both favour this view; but, if so, what are the parent species? The puzzling *Carduus* found at Saffron Walden, by Mr. Gibson, is placed as a variety of *C. acaulis*, and the synonym of *C. dubius* (*Willd. Flo. Berol.*) cited for it.

But we find our notes on the species running out to a length which suggests the propriety of arresting their course awhile. Should space allow, they may perhaps be resumed and concluded in the next or following No.

C.

Further Experiments bearing upon the Specific Identity of the Cowslip and Primrose. By HEWETT C. WATSON, Esq.

IN the second volume of the 'Phytologist' (Phytol. ii. 217) I recorded the result of an experiment by sowing the seeds of a plant, so intermediate in its characters between the cowslip and primrose, that it might be held a variety of either or a hybrid of both. The result was, that genuine cowslips, genuine primroses, with various intermediates, were all produced from the seeds of the one plant. Last year I repeated the experiment; and on the flowering of the young plants, this year, the result is the same. Such precautions were taken as insured an extreme improbability that any seed of a *Primula* could be lurking in the soil used, or could afterwards be carried to it accidentally. This time, a smaller number of seeds vegetated, producing fourteen young plants, now living, after a few deaths in the family. Six only of these young plants have flowered this spring, and on naming them so as to correspond with my former list, the result is numerically thus:—

True cowslip (<i>Primula veris</i> , Lond. Cat. &c.)	-	-	1
Cowslip passing to oxlip (<i>P. veris</i> var. <i>major</i> , L. C.)	-	-	0
Oxlip (<i>P. vulgaris</i> var. <i>intermedia</i> , L. C.)	-	-	1
Caulescent primroses (<i>P. vulgaris</i> var. <i>caulescens</i> , L. C.)	-	-	3
True primrose (<i>P. vulgaris</i> , L. C., &c.)	-	-	1
Plants producing no flowers this season	-	-	8

The numerical results will appear better another season, when the flowerless plants of this year may be strong enough to show what they are.

Coincidentally with the preceding, I have tried another experiment, which has produced a result such as I did not at all anticipate; and which, it may be feared, will make Mr. Marshall still more suspicious that there must have been a "hitch" somewhere in the experiment (See Phytol. ii. 285). I singled out a cowslip, some yards apart from any other *Primula* in my garden, of vigorous growth, but otherwise a fair average cowslip in flower and leaf. The plant was marked while in flower, and ripe seeds afterwards taken and sown, with equal precautions, as in the above case of the oxlip, against intermixture with the seeds of any other *Primula*. From this sowing I have now twenty-one young plants alive; but several of them are very small, and only three have produced flowers. As far as can be determined at present, all the young plants possess the ordinary leaves of the

true cowslip. But the three flowering examples differ considerably in their corollas from the wild cowslip, while they closely resemble each other. By their umbellate inflorescence, short pubescence, and broadly toothed calyx, they may be considered cowslips, equally as by their leaves; but their corollas are a third or a half-way towards those of the primrose, in size, in form, and in colour. They might be placed as a link between *P. veris* and *P. vulgaris*, *variety* *intermedia*, of the London Catalogue; that is, between the cowslip and the 'Claygate oxlip.'

As the wild cowslips and primroses present several very obvious dissimilarities, — in flowers and leaves, in form, colour, pubescence, in mode and time of inflorescence, — some skepticism on the point of their specific identity is reasonable enough. Nevertheless, the ultimate acquiescence in this long-suggested view appears to be inevitable. Certain assumptions about the laws of hybridity might plausibly account for some of the facts, yet they will not suffice to explain all. Hybridity would sufficiently account for the appearance of intermediate forms; and the paucity of oxlips, as compared with the innumerable cowslips and primroses, is just what might be fairly anticipated under that theory. The fertility of the intermediate oxlip, or presumed hybrid, is no insuperable difficulty to get over, seeing that other hybrids, vegetable and animal, are said to be occasionally fertile. The true difficulty lies in the fact, that the hybrid *Primula* (if such it be) not only reproduces its own likeness in its progeny, but the exact counterparts of both the presumed original species also. Now, would any horse-dealer expect his mules (when fertile) to produce indifferently mules, or horses, or asses?

I perceive that certain writers in the 'Phytologist' do not understand the bearings of these experiments upon some of the great problems of science. In their eyes, accordingly, the repeating and recording of such experiments will naturally wear the look of scientific peurilities. But, for my own part, I have no hesitation in expressing a conviction, that experiments of this kind, both with plants and animals, are at present very much needed; and that there is fair reason to anticipate much important addition to our knowledge of the laws of nature, more or less directly arising from them, — supposing them to be made extensively *and carefully*.

For the purposes of technical or descriptive botany, it is desirable to ascertain *how* widely individual plants or varieties can differ from the typical character of their species. And the same remark may be equally extended to zoology.

In physiology there are unanswered questions of much interest and real importance, connected with the laws of hybridity, hereditary transmission of peculiarities, and transmutation of forms and qualities, which such experiments are calculated to throw light upon.

And in some of the grand (if hypothetical) investigations into the past history of the earth and organic nature, which have latterly occupied scientific attention, the absence of clearly ascertained facts respecting the range of specific variation, has been very strongly felt; and, it may be truly added, detrimentally acted upon; because, in the absence of ascertained knowledge, hypothetical ideas are substituted in place of induction, and cannot be refuted even if erroneous.

H. C. WATSON.

Thames Ditton, May, 1847.

BOTANICAL SOCIETY OF LONDON.

7th May.—John Reynolds, Esq., Treasurer, in the chair.

Dr. Parkin, of Brompton, the Rev. J. F. Crouch, M.A., of Corpus Christi College, Oxford, and Mr. R. Davis, of Pimlico, were elected members.

Various donations to the library were announced. British plants had been received from Dr. Wood, Mr. Sansom, Mr. Meehan and Mr. Roby, and a collection of Azorean specimens from T. C. Hunt, Esq., H. M. Consul at St. Michaels.

Mr. Hewett Watson exhibited specimens of an aquatic *Ranunculus*, hitherto unnoticed as a British form in that genus. In its characters it is intermediate between the two groups of varieties (or quasi-species) included under the names of *aquatilis* and *hederaceus*; having the floating leaves of *aquatilis*, with the small flowers of *hederaceus*. As far as can be decided while the fruit is immature, the plant exactly corresponds with the figure of *R. tripartitus* in the Atlas of Cosson and Germain, making one important exception, in the total absence of submersed leaves with the capillary segments. Fresh examples of *R. Lenormandi* and *R. hederaceus* were shown at the same time, in order to illustrate the differences. Two forms of *R. aquatilis* were also exhibited; one with the usual large flowers, the other with flowers about half the size; the latter being possibly *R. Peteveri*. All the five forms were collected the day before, on Esher Common, Surrey.

Mr. Watson also exhibited examples of the true *Viola flavicornis* of Smith in contrast with the *V. canina* of Linnæus. They were brought to the meeting in order to show, by fresh specimens, the differences between the two (both in leaves and flowers), which were very perceptible. Mr. W. remarked that small specimens of the ordinary *V. canina* had been erroneously figured in the 'Supplement to English Botany' for the *V. flavicornis* of Smith, and that Mr. Babington persisted in repeating the same error in the second edition of his Manual (published that day), although he could not fail to know now that the application of Smith's name "*flavicornis*" to the plant of the 'Supplement' was an error on the part of Mr. Forster.

Mr. Watson also exhibited a variety of *V. canina* with smaller and lighter coloured leaves than usual, and a smaller and pale purple or pinkish corolla. He had found the original root several years ago, in Surrey, and removed it into his garden, where it had flowered and seeded year after year, all the seedling plants springing up around it, still resembling the parent plant in size and colour, without a single example of the ordinary *V. canina* appearing among them. He adduced this fact in order to show the hereditary repetition of a variety without instances of reversion to the normal characters of the species; and that, too, in a character usually deemed so inconstant. Such a repetition is frequently accepted for evidence of specific distinctness; and yet cases like this prove its insufficiency.

The secretary stated that he had Dr. Greville's authority to say that he never collected *Potentilla rupestris* on Ben Lawers, and that probably some mistake had been made through the similarity of name with *Potentilla alpestris*. But that it is quite certain that the exhibited specimen was *P. rupestris*, and it was rightly named on its label, although (as now appears), inaccurately localized.

A communication was read from Dr. Parkin "On the Cause of the Failure of the Potato Crop," and of epidemic diseases in general, indicating "that such maladies are not only the effects of volcanic action, but also that the immediate cause of their production is the generation of a gaseous substance in the internal reservoirs, and its extrication into the surrounding atmosphere through the superincumbent strata; and endeavouring to show that the pathological phenomena presented by this vegetable pestilence were only reconcileable on the supposition that a gaseous, extraneous and deleterious substance had been introduced into the interior of the plant." The paper went into a train of reasoning to prove this conclusion to be a correct one, as indicated by the results of the application, in planting,

of the different forms of carbon (charcoal), the beneficial operation of which appeared to be explained on the supposition that some deleterious and gaseous substance has been absorbed and neutralized. No other cause could account for the success which has attended its employment.

The writer argued that it was not as Mr. Jasper Rogers and other writers conclude, because charcoal contains within itself that carbonaceous principle which restores to the plant that of which it has been deprived (by constitutional debility), that the benefit derived from the employment of this substance is to be ascribed, but simply to its antiseptic or specific properties, and by its neutralizing some gaseous and deleterious substance present in the soil. Dr. P. considers this conclusion important, not only as regards the present custom, but also with respect to the operation of manures, more particularly putrescent ones, at ordinary times. Hence, his object in directing the attention of botanists and agriculturists to this point at the present moment.—*G. E. D.*

An adjourned meeting, constituted for the purpose of investigating the potato-disease, and of more than ordinary public importance, in relation to the increasing high price of food, was held on Friday evening, at the rooms of the London Botanical Society, Bedford-street, Strand; J. Reynolds, Esq., Treasurer of the Society, in the chair.

The CHAIRMAN opened the business by calling on the Secretary, Mr. G. E. Dennes, to read the minutes of the last meeting, amongst which was a resolution setting forth that the Society wished it to be distinctly understood that they were unanimous in their opinion of the absurdity of the theories brought forward as to the evil produced to the potato crop by insects, and more particularly by the *Aphis vastator*.

The SECRETARY then read a communication from Mr. Jasper W. Rogers, C.E., presenting to the Society two essays, published this month by him, on the potato disease, its causes and prevention, and which were presented to the Government of Ireland previous to the labours of the Potato Commissioners, in 1845, and submitted to the Royal Dublin Society, and the Royal Agricultural Society of England, in 1846. The communication stated that Mr. Rogers's object was not to detract from Dr. Parkins's merit or originality of idea;

and after observing that it was a well-known fact that the same thoughts have struck men's minds simultaneously, although hundreds of miles asunder, and led them, although acted upon by different influences, to identical conclusions, ended in soliciting public replies to the following questions:—

“Does the potato contain the quantity of nutritive matter I have pointed out?

“And will not the same extent of land, cultivated at the same cost, produce, on the average, at least three times the weight of dry matter, or meal, from the potato, that can be produced from wheat?

“Does not the potato possess the same capability as wheat of being converted into meal and flour, at least equally fitted for storage and preservation, as food for man?

“Why, then, should we use it solely as a boiled vegetable?

“Would it be *more barbarous* and ungrateful *now* to only *boil* ~~shoot~~, and use it as our forefathers have done as ‘furmety,’ and then say wheat should be banished the land, than to save ourselves the trouble of making the potato into meal and flour for bread, that we now cry out to banish it?

“In omitting to make ourselves aware of the real capabilities and uses of the potato, do we not ignorantly abuse a generous blessing?

“In a word, are the means to aid ourselves in our hands, both as to the preservation and proper use of the potato, and if so, whether should we use them or *pray* for the grant of some other blessing, to be, perhaps, equally abused and forgotten?

Mr. ROGERS, then, at the request of the chairman, stated that the disease of the potato, in his opinion, had arisen from planting it in the *Spring* in place of the *Autumn*; that by doing so, the potato, being placed in the pit or clamp when taken out of the ground, was in a warmer atmosphere during the winter than it would be if lying on the ground; that therefore it grew or shot forth, and the growth or shoots being afterwards taken off when it came to be planted in spring, it followed that the offspring must be weak in proportion to the extent of life which the shoot took from the tuber. That the winter quarters of the last ten or twelve years have been of a temperature nearly equal to the spring quarters of former years; and that therefore the growth in the pit has been considerably more for the last ten or twelve years than formerly; and of course that, in proportion as that growth in the pit increased, so must the vitality of the potato be diminished, because all the shoots left behind were so much of the life absolutely lost. Now, the remedy for that was,

simply to plant the potato in autumn in place of spring, because, as the shoots came forth, directed by Nature, they would progress, or be otherwise affected according to Nature's will. Nothing, therefore, could be lost of the whole vital principle to be derived from the tuber, which is absolutely essential in order to the production of a strong offspring. That in planting in autumn no evil need be apprehended from frost during the winter; that even, if the potato be frozen in the ground, and thaw gradually afterwards, it will not be injured in its vital principle. That, as regards the productive value of the potato as a food for man, it was equally capable of being converted into meal and flour for use, in bread, soups, porridge, jelly, plumonge, &c., as the meal and flour of wheat and oats, and was even more capable of being preserved by storage. Bread, he might add, had been made from the potato so far back as the year 1814, for the use of the French prisoners at Dartmoor; and by desire of the Irish Government, he (Mr. Rogers) carried into effect the manufacture of meal, flour, &c., from diseased potatoes at the South Union of Dublin; that he there had *bread, soups, jellies, plumonges, cakes of all kinds, and porridge*, for the use of the paupers, and invited about 150 of the scientific men of Dublin to partake of the *dejeuner*, served in the Board-room of the South Union; and that every description of food was pronounced to be excellent; and that it was shown a saving of £1,500 a year could have been effected in feeding the paupers of the Union, by the paupers themselves manufacturing the potato into meal and flour; and that the medical officers of the establishment also pronounced the food to be of the best description.

Dr. BOSKEY here asked Mr. Rogers what quantity of "gluten" was contained in the potato in comparison with wheat.

Mr. ROGERS replied, that the actual quantity of gluten (that which creates the bone and muscle of animals) contained in the dry matter, or meal of the potato, was only about $2\frac{1}{2}$ per cent. less than contained in the dry matter, or meal of wheat, and that the same quantity of ground cultivated with potatoes would produce three times the weight of dry matter as the same extent of ground cultivated with wheat; that in addition, the whole dry matter of the potato was always capable of being made use of in bread, while the whole dry matter of wheat was not, insomuch as the bran (in which the greater portions of the gluten remained) was solely used for the food of animals; consequently, that the general value of the meal or flour of the potato was above that of the flour of wheat, and that the usual first flour of wheat, in reality, only contained 8 or 9 per cent. of gluten. (Mr. Rogers

here exhibited whole meal, meal, inferior flour, and first flour, made from diseased potatoes, by the paupers of the South Union of Dublin, which were examined and tasted with much interest and curiosity, by the gentlemen composing the meeting. The meal had all the appearance of that made of oats and peas, and the flour was as white and fine as that produced from wheat.)

Dr. BOSSEY asked Mr. Rogers, could it be possible that the potato contained one-seventh of gluten?

Mr. ROGERS replied, that the tables which he had given were compiled by Sir Robert Kane, and from all the leading French chemists, who understand infinitely more of the potato than we do ourselves; that he did not wish the meeting to depend at all on his *ipse dixit*, but that they would find, in addition to those authorities, that the analysis subsequently made by the Potato Commissioners, also by Professor Johnson and by Mr. Fromberg, all agreed as to the quantity of gluten, or more properly speaking, "protean compound," which was actually in the potato.

Dr. AYRES was of opinion that the quantity of gluten stated by Mr. Rogers could not exist in the potato, inasmuch as there was such a quantity of aqueous matter in it as 75 per cent. His opinion was, that the "nitrogenous" matter in the potato was much less than in wheat; and he was also of opinion, that there was much less of nitrogenous matter in the potato than in peas, beans, or barley.

The CHAIRMAN.—What are the proportions, Mr. Rogers, of gluten in wheat and in the potato?

Mr. ROGERS.—About 14 per cent. of gluten in the dry matter of the potato, and about $17\frac{1}{2}$ per cent. in the dry matter of the wheat.

The CHAIRMAN.—What is the quantity of dry matter contained in the potato?

Mr. ROGERS replied, that the average was 25 per cent., or one-fourth.

The CHAIRMAN.—Have you taken into consideration the quantity of wheat and potatoes produced in a given quantity of land?

Mr. ROGERS was glad the Chairman had asked him that question, as it afforded him the opportunity to state an interesting fact. His calculations were made according to the experience of the French chemists, who took the average of about nine tons of potatoes per acre; while it was a fact now well known that above thirty tons of potatoes had been frequently produced from the Irish acre, when properly cultivated.

Dr. BOSSEY wished to know what was the quantity of aqueous matter in the potato, to which

Mr. ROGERS replied, that it might be averaged from 72 to 78 per cent.

Mr. WOOLLETT asked whether the process was not more simple in the preparation of meal and flour from the potato than from wheat?

Mr. ROGERS replied, that it would be infinitely more simple, and that any farmer who had the apparatus for making cheese, would, by the addition of a common bread-grater, be enabled to prepare meal and flour for his household use. Mr. Rogers then described the operation to consist in grating the potato on a bread-grater into a tub of water: the whole matter, when grated, settles down to the bottom, and, after changing the water two or three times, becomes fit to be placed in a cloth made up in the shape of a small parcel; and the water being pressed out of it by means of a cheese-press, or common lever, the cake thus formed may be dried on a cloth or tray before the fire, and on being broken up by the hand, and run through a common coffee-mill, will present the whole meal of the potato. This whole meal, sifted in the same way that the farmer sifts the whole meal of wheat, will give the different descriptions of flour required for household use.

Mr. WOOLLETT thought that much of the nutriment would go off in the water.

Mr. ROGERS said his impression was that little, if any, went off so; but that if it did, the analysis made by the French chemists and others had been on the dry material, and that, therefore, whatever quantity had gone off in the water was not taken into account in the tables given.

Dr. BOSSEY was curious to know what quantity of potatoes was considered necessary to support a working man per day, he asked the question in relation to the quantity of nutriment necessary per day to support a man.

Mr. ROGERS replied, that those of his poor countrymen who had nothing else but the potato to live upon, usually used three-quarters of a stone a day, in three divisions or meals; and that that was his principal reason for so strongly advocating the preparation of meal and flour from the potato, in order that they might obtain its nutritious value in a properly condensed state, in place of being obliged to gorge themselves with 75 per cent. of useless aqueous matter contained in the potato when only boiled. He would not, however, be understood to advocate altogether the discontinuance of the use of the potato in its

“boiled” state; but he had proved that it could be more beneficially brought into use in other forms.

Mr. WOOLLETT was desirous, before the meeting separated, to communicate an opinion that was daily gaining ground amongst experienced farmers, that the potato-disease would soon disappear; and that the potato would again be restored to its healthy state. He was also anxious to bring under the notice of the Society a singular and interesting fact connected with the diseased potato, that had come under his own observation in Suffolk, namely, that the potatoes which were found to be diseased in August, and which were left in the ground as not worth digging, shot forth again in the spring, and produced good growth and sound, the only difference between them and potatoes before the disease being that they were a little darker.

Mr. ROGERS bore Mr. Woollett out in this statement, having himself witnessed it; and information from Ireland, within the last few weeks, represented that in many instances where potatoes had been abandoned in the ground as totally useless, they had every appearance of producing good crops this year. He rejoiced at the experiments which the famine had led to as to the value of the potato; and notwithstanding all the attempts which had been made to cry it down, and to abolish it, he believed in his heart there was infinitely more value in it than in wheat, inasmuch as the same quantity of land would produce three times more than could be produced from wheat. And was it not, he would ask, monstrous in the face of such a fact, to conceive that the use of the potato, so valuable, should be abolished, and that such a recommendation should come from leading men of the country? Let them look at the thing in its proper light, and consider, if the potato be abolished, how can three acres of land be added to the cultivatable soil of the country for the purpose of producing wheat, for each acre that is now used to produce potatoes.

Mr. FRANKLIN COXWORTHY addressed some remarks to the Society on his opinions as to the cause of the potato-disease, and on meteorological influences.

After which, on the motion of Mr. WOOLLETT, the thanks of the Society were voted to Mr. Rogers for his statements, and the meeting resolved itself into a conversational party.—*Morning Advertiser, May 10th.*

BOTANICAL SOCIETY OF EDINBURGH.

Thursday, April 8th, 1847.—Dr. Greville, President, in the chair.

Donations of botanical works were announced from M. Barneoud, Paris; Professor Morren, Liege; and Mr. Chas. C. Babington, Cambridge. And specimens from Professor Balfour, Mr. Babington, Mr. T. J. Syme, and Dr. Carpenter, London; and Mr. Hamburgh, Isle of Wight.

The following communications were read:

1. Description of an East Indian palm, *Areca triandra*, of Roxburgh, by Dr. Balfour. The plant has recently flowered in the Botanic Garden; and cut specimens of the spadix, spatha and leaves, with a drawing and dissections of the flowers, were exhibited.

2. Notes of a botanical trip to the Isle of Wight, in August and September, 1846, with remarks on the geographical distribution of the British Flora, by Dr. Balfour. After giving a general description of the geological features of those parts of the island which he had visited, Dr. B. enumerated some of the rarer plants found by him near Yarmouth, the Needles, Ventnor, Ryde, and Newport: among these were some of the rarer species of *Rubi*, *Calamintha sylvatica*, *Cyperus longus*, *Matthiola incana*, *Orobanche barbata*, *Inula Helenium*, *Spartina stricta*, *Dianthus prolifer*, *Melampyrum arvense*; remarkable specimens of *Campanula glomerata*, about an inch high; *Agrostis setacea*, *Calamagrostis lanceolata*, *Tamarix anglica*; *Hieracium inuloides*, &c., &c. Dr. Balfour next alluded to the nature of the plants found in the island in a geographical point of view, as belonging to Professor E. Forbes's Devon Flora and Norman Type; and illustrated his remarks by a set of specimens, so arranged as to show at one view the various Floras of Great Britain and Ireland.

Dr. Balfour afterwards read extracts from a letter from Mr. N. B. Ward, of London, giving a short account of the successful mode in which he has been cultivating the rarer ferns, *Jungermannia*, and mosses in his plant cases.

The following members were elected: A. F. Adam, Esq.; Stanhope Templeman Speer, Esq.; John Duncanson, Esq.; Robert Nasmyth, Jun., Esq.; and R. S. Cid de Bivar, Esq.; and Mr. W. M'Ivor and Mr. John Laing, were elected associates of the Society.

Thursday, May 13th, 1847.—Dr. Greville, President, in the chair.

Donations of botanical works were announced from M. A. De Candolle, Geneva; Hon. G. Cunninghame, Mauritius; and G. Munby,

Algiers; and specimens of plants from Dr. Philip W. MacLagan, and Dr. Dickie.

The following communications were read:

1. Notice of plants collected in the line of the Rideau Canal, Canada West. By Dr. Philip W. MacLagan.

In this paper Dr. MacLagan gave an enumeration of the plants observed by him along the line of the Rideau Canal, in May, 1843. This great work, which commences at Bytown on the Ottawa, and terminates near Kingston on Lake Ontario, is about 137 miles in length. The points examined were Smith's Falls, about half-way between Bytown and Kingston; the Isthmus and Davies' Locks, some miles further on; Jones' Falls, 30 miles north of Kingston; and Kingston Mills, within five miles of the latter town. The paper was illustrated by dried specimens collected during the route, and living plants of Trilliums were exhibited to show the peculiarities of the Flora.

2. Notice of the discovery of *Gagea lutea* in Dalkeith woods, by Mr. James Mitchel. Communicated by Dr. Balfour.

Specimens of some rare Orchids from South America, and of a new shrubby plant belonging to the Compositæ, were exhibited from the hothouses of the gardens.

Dr. Balfour exhibited a piece of turf containing numerous fresh specimens of *Primula Scotica*, received from the vicinity of Thurso, through the kindness of R. Heddle, Esq., who remarks that the plant, which is common all along the northern shores of Caithness, flowers several times a year, from May to December; and that in the later flowering specimens the limb of the corolla is much thrown back. He also mentions *P. acaulis* as common, but has never observed *P. veris*.

The following gentlemen were admitted ordinary resident fellows of the society: Andrew Brown, Esq., 13, Argyle Square; Robert Foulis, Esq., F.S.S.A., Bruntsfield Lodge; and Dr. Dubuc, 121, George Street.

Notes on Viola odorata, and its Occurrence in Fifeshire, &c.

By GEORGE LAWSON, Esq.

THE sweet purple violet is a sweet flower indeed: the very mention of its name calls to our minds thoughts of the most pleasing character;—our hearts throb with happy emotion—and a thousand scenes of loveliness are called to our recollection. Sunny braes and shady

banks, lofty hills and lowly vales, where are scattered "free and wild" the bright gems of Flora, and where we used to wander to behold their beauty. It is with feelings of delight, indeed, that the lover of nature—he "whose pleasures are in wild fields gathered;" he to whom "the meanest flower that blows can give thoughts that do often lie too deep for tears,"—it is with heartfelt delight, indeed, that he gazes on the first flower of the spring—the little herald of "joyous summer time." He reads in its humble flowers of coming pleasures. He admires the sweet thing for its own sake, as, in its humility, it shyly peeps from under the green herbage of its shaded bank,—he enjoys its simple beauty and its delicious fragrance—and not only those of the little flower itself, but the dear remembrance of many another sweet gem which it calls to memory. He reads in its bright flowers of the coming of the blushing rose and the briar; of the pale primrose, the purple heather, and the lowly lily of the vale,—yes, and of many more.

During the present season I have had the pleasure (and it has been to me a real heartfelt pleasure) of finding the sweet violet in several localities in this county. From the interest attached to the plant, as well as from its being considered "very rare in Scotland," I am induced to send you a note of these localities for the 'Phytologist.' I do not set down the plant as *indigenous* at each of the following stations, or indeed any one of them; but it seems quite naturalized at all of them: and I believe that it can only be considered in the light of a *naturalized* plant to Scotland.

The first station which I desire to record is the north bank of the beautiful river Eden, just a short way up the river from the fine old bridge of Dairsie, and at the foot of the declivity, at the top of which rear in sacred majesty up through the surrounding lofty trees, the venerable time-worn church and spire, and the crumbling ivied ruins of the old castle. Here I find the plant growing profusely upon the steep banks, and even descending to the flat ground within two feet or so of the river. And here have I frequently enjoyed a calm and serene wander along the green margin of the placid river, when, under the kindly shade of osiers and bird-cherries, the little violet peeped modestly forth, and flung its sweet odours to the passing zephyr. It likewise grows in some profusion on a steep sunny bank on the outside of the wall that encloses the old burying-ground on the south side. And here it is delightful to see the sweet things basking in an April noon-day sun, and an early wild bee wandering from flower to flower gathering honied treasures. I may here offer a remark in regard

to the situation of the little bracteas on the scape, as a distinctive character betwixt this species and the *V. hirta*. The words of Mr. Curtis, as quoted at page 86 of vol. i. of Hook. Brit. Flora, ed. v., in regard to this character, are, "here (that is, *in hirta*) below, in *V. odorata*, above the middle." At the Dairsie station for *odorata* I have observed *many* scapes with their bracteas far *below* the middle of the scape, and many more whose bracteas seemed so exactly in the middle, that it was quite impossible to say that they were either above or below it. However, by far the greater number of individuals that I have seen (and I have examined some hundreds) *have* their bracteas above the middle of the scape, although this certainly cannot by any means be considered a constant character. I am led to think that the situation of the bracteas is much more constant in *V. hirta* than in the species more particularly before our notice, as last month, while on a visit to Dundee, I examined numerous specimens (of *hirta*) at Wills braes near that town, in company with my esteemed friend Mr. John Sime, and with some difficulty found only a *few* examples of the bracteas being about the middle, and but *one* with these slightly above it. On referring to the "*mummies*" I possess of the growth of former years, I find some specimens of *hirta* with the bracteas very near to the base of the scape; but none showing these even near so far up as the middle. In specimens I have of *V. odorata*, from Derbyshire and Forfarshire (the former gathered by Mr. Joseph Whittaker of Bread-sall, the latter by myself) the bracteas are all far above the middle. My observations lead me to conclude that *generally* the bracteas are in *V. hirta* below, and in *V. odorata* above the middle of the scape, but that the exceptions to these *rules* are of so frequent occurrence as to render them unsuitable as characters of distinction.

The next station I have to record for our sweet gem is the Douket Hill,* at Craig-foodie, where it grows in great profusion under the leafy shade of many trees. Here the violet grows luxuriantly, and quite wild-like: I understand it has done so for many years; but it has probably been originally an escape from Craig-foodie garden, of which the station is in the immediate vicinage.

At Clayton the violet grows profusely in the turf of the pleasure-grounds; but the frequent mowing of the grass prevents the flower-buds from bursting into blossoms, for they are generally cut off before they reach maturity. Here there cannot be a doubt that the plant is

* In plainer English, Dove-cot Hill, so named from a dove-cot or pigeon-house standing upon it.

only naturalized; the more clearly does this appear when it is seen growing side by side with the daffodil and the crocus, neither of which *can*, by any mortal, be considered indigenous.

A few straggling plants of the violet grow on the *remains* of the old gateway at Airdit, and near to a little shady bank where the snowdrop so pure and pale raises its little flowers. These sweet things both seem *wild* at Airdit; but there can be no doubt of their having at one time escaped from the garden, which, in the days of old, it was their part to lend their beauty in ornamenting. The mansion and gardens are now no more; but these flowers remain to tell of the glory and grandeur and gaiety that is gone.

The violet likewise grows in Earls' Hall Wood, near to what used to be the entrance to the principal approach to the hall. The plant is not very plentiful at this place, and may probably have wandered from the hall garden, although it is now full half-a-mile from it. It seems naturalized here.

GEORGE LAWSON.

Dairsie muir, via Cupar, Fifeshire,
May, 1847.

Notice of 'The Elements of Botany, Structural and Physiological, &c.
By JOHN LINDLEY, Ph. D., F.R.S., &c.'

THIS is avowedly a fifth edition of the 'Outlines of the First Principles of Botany,' with additions. We are told in the Preface, that "the author has taken advantage of the opportunity thus afforded him of bringing it completely up to the state of botanical knowledge, without, however, interfering with its original plan, by the introduction of doubtful or merely speculative matter, or of questions which do not interest a student. It was in the outset a book for learners; its purpose was to state plainly and concisely the great facts of the science, and to separate them from the ulterior questions to which they lead," &c. "The book is for learners, and not for proficient; the author regards it in no other light, and puts it forth with no higher pretensions." "The true purpose of the work being thus explained, the reason why many things have been omitted will become obvious—they are of no importance to students. This is the case with minute anatomy, which cannot be prosecuted far in a Botanical course, and which, however interesting and important it may be, has no obvious bearing upon Vegetable Physiology, when carried beyond what is taught in the following pages. The theory of Spiral Structure, which

is wholly omitted, does not effect any question which students are interested about; in like manner, the obscure and disputed phenomena of Vegetable Fertilization, of Irritability and other vital actions, of the little modifications discoverable among seeds and fruits, the structure of Cryptogams, belong to a class of facts which can only be dealt with by those who have advanced beyond the state of pupillage."

Of a work planned to meet this purpose, written by an experienced teacher and botanist of the highest attainments, and improved and corrected through five successive editions,—what can we say, or be expected to say, except that the work is perfect after its kind; the purpose and promise being fulfilled in a satisfactory manner. It may signify little that we, while confessing ourselves inexperienced in tuition, do nevertheless deem some of the excluded matters more important to students than are some of those which are allowed place and notice in the volume. Such diversities of opinion are certain to arise; and that they are not differences which arise only from the relative position of the parties as instructors or the contrary, might be made evident enough by comparing the elementary works of various different teachers; some of whom obviously attach great importance to the very points which Dr. Lindley passes by. The instructor is unavoidably biassed in judgment by the natural peculiarities of his own mind, by those of his education, by his individual objects and pursuits in life, &c. So likewise must be the student; whether medical, agricultural, chemical, or otherwise.

We take it, however, that Academical lectures to students, and books to be used in connexion therewith, do apply, in far the majority of cases, to medical students chiefly; and to this class we believe that the "obscure and disputed phenomena of Vegetable Fertilization, of Irritability and other vital actions" are matters of much interest and importance, because a comparison between the functions of animal life and those of vegetable life tends to their mutual elucidation. We take it this should be a leading object in botanical classes for medical students. Our academical and professional lecturers on botany, however, in their attempts to persuade medical students that botanical science is of *some* use to the medical practitioner, do seldom convince them of anything better than the fact, that no practical advantage is ever likely to arise to them, from the little knowledge of botany which they are compelled by regulations to acquire. But to pursue this subject here would be out of place. Could we have our own way, we would absolve all medical students from their compulsory attendance at botanical lectures; as consuming time and intellectual labour which

might be given to other professional studies with far more compensating advantages. But as we cannot effect this boon and benefit for the unlucky students, we should like well to see their abhorred botanical lectures rendered interesting and useful (at least, not quite so uninteresting and unuseful) by a tacit understanding between teacher and students, that he should teach them botany just so far as it can be shown to bear upon their professional views and knowledge, without exacting from them any farther acquaintance with the subject. But the 'Elements of Botany' is a work of course addressed to students generally; and if practically for medical students more than for others, it is still intended for them as general learners of botany, and not as learners of the medical bearings and uses of that science. As such, it must be viewed; and as such, it is undoubtedly a very useful and instructive work. Many a botanist, who deems himself far above "pupillage," might profit by perusal of its pages; and truly we say this on our individual experience. We have seen newspaper Editors candidly state that they lived by finding fault; for, if they commended only that which pleased them, and avoided that which displeased, they would soon cease to be read. There is much in the 'Elements' which pleases,—a little which displeases. Illustrations of each may be drawn from a chapter on "the Manner of Studying"—no useless addition to the 'Elements of Botany.'

"Take any common flowering plant," says our author, "no matter what, and examine every part of its structure, making careful drawings of what you see, and securing preparations for examination at a future time." "There can be no doubt that the exact investigation of the structure, in all particulars, of the commonest plant, tends more to a correct knowledge of botany than the superficial examination of all the plants in nature." "Such an investigation forms an exact standard of structure, to which all other cases may be compared." "As soon as the structure of one plant is ascertained, another should be taken, and the points in which it resembles or differs from the first subject noted down, and, if possible, also drawn. A continual repetition of this operation with fresh plants is what eventually leads to botanical knowledge."

This advice is sound; and it is so simply because it directs the mind of the learner nearly in the same course that nature herself does. Individualities are the first steps in all departments of knowledge; and exact individualities are the foundation of science. But we must dissent widely indeed from the soundness of our author's advice, when he goes on to say, "At first, species should be little attended to,

genera more, and natural orders very much." We have no doubt that Dr. Lindley commenced his botanical knowledge with "species," and not with "natural orders;" and the very terms in which he commences the chapter under consideration are at variance with this subsequent advice. He bids the student "Take any common flowering plant" and "examine every part of its structure." What is this but studying the species? If attention to orders were the right way of commencing the study, why not say instead "Take a bundle of Compositæ, and examine those characters in which they correspond," &c., &c.

But Dr. Lindley is not the author to be charged with advice-giving on no plausible reasons; although, in this instance, we cannot admit the sufficiency of his reasons; namely, "Because," he writes, "in a vast science like Botany, containing perhaps 100,000 so-called species, distributed through about 9,000 genera, collected under scarcely more than 300 natural orders, the mind becomes bewildered unless the smallest groups are first investigated. That is to say, 300 distinctions are more easily remembered than 9,000." But if Dr. Lindley will take the trouble to throw the implied assertions contained in the quoted passage, into the form of syllogisms, he will find his reasoning insufficient to establish his conclusion. We meet it in the more familiar manner, by asking whether a child requires to know 100,000 specific distinctions, or 9,000 generic distinctions, or 300 ordinal distinctions, before learning to know "buttercups and daisies," as the song of Mary Howitt runs? — or whether, the student of British botany may not perfectly well know the species of British plants, that is, quite as well as they are known by Dr. Lindley himself, without learning the distinctions of all other species, genera, and orders? The truth is, real knowledge is always special—always specific. General ideas are only vague ideas where the mind cannot give them special illustrations, that is, cannot represent them by specific facts or objects. The very names of the orders in botany accord herewith. They are either taken from some single point of structure (Compositæ, Cruciferæ, Leguminosæ, &c.) or imply a comparison of all the included species with some special type or example (Ranunculaceæ, Liliaceæ, &c.). Dr. Lindley adds also, "Nor can the power of generalizing be so readily acquired, as when the student habitually descends from generals to particulars." This, again, seems just the reverse of the fact. All correct generalization is an ascent from particulars to generals. It is true, we may often advantageously reason downwards from generals to particulars, *after* the general ideas have been acquired; but their first clear acquisition comes through particular and special knowledge.

Whatever differences of opinion we may entertain respecting some of the author's recommendations on the "manner of studying," we shall certainly not express any against his concluding and pithy remark that "neither they nor any others have real value in the absence of

METHOD, ZEAL, and PERSEVERANCE."

What an instructive botanical sermon might be written upon this text! How strikingly does the deficiency of any one of these three qualities detract from the results of the other two! We know individuals of really contracted mental power, who have risen to more than respectable eminence in the scientific world, by a happy combination of these three qualities. And, on the contrary, we know individuals of higher mental calibre, whose botanical efforts have been greatly impeded by the want of one of them. There is doubtless a natural adaptation to botanical pursuits, to be included among the requisites; but this may be said to constitute the chief ingredient of true zeal, which is simply a strong mental impulse in a determinate direction.

Turn to another portion of the work, and see, reader, what Professor Lindley bluntly writes on cell-formation, &c. "The manner in which the elementary organs are developed is at present uncertain." In a foot-note he enters more explicitly on his reasons for making this (we fear, too true) statement. "The reader who has never investigated this subject for himself, and who is unacquainted with its difficulties, may be surprised at this statement; but I can come to no other conclusion. In fact, the uncertainty of the facts to which evidence points, and the enormous obstacles that exist in determining what are facts and not deceptive appearances, are sufficiently shown by the conflicting opinions entertained by the most accomplished observers. When men like Mirbel, Mohl, Schleiden, and Nageli, are directly opposed to each other, although their lives have been largely devoted to the pursuit of the inquiry, the prudent man will pause before he forms his opinion."

Now, when we think of the quantity of pages written on the formation of cells or cell-membrane, and regard that as some measure, on a very reduced scale, of the quantity of time and labour devoted to the subject, it is almost painful to acknowledge that the result is yet *nil*. The author of the 'Vestiges,' wishing to show that the opinions of most cultivators of science are valueless in great general views, says sarcastically that "facts the most minute make scientific reputations."

Should any satirical botanist call that clever author's attention to Dr. Lindley's frank admission, and at same time inform him that many botanists found much of their pretensions to scientific eminence upon microscopical observations on the formation of cells, he might well feel warranted in applying more depreciating expressions than the simple term "minute." Suppose he should write that "Facts the most minute, uncertain and useless, have made scientific reputations." Suppose he should thus write, we ask, who could say the sarcasm is untrue? Nevertheless, we trust a time will come, when certainty and value may be found in such microscopical investigations; and at all events they now serve for innocent amusement to a class of scientific minds which are fitted by nature to look after "facts the most minute;" and minute facts may still be important facts.

C.

Notice of a 'Manual of British Botany.' By C. C. BABINGTON, M.A.'

(Concluded from page 851).

WE resume our comments upon some of the ideas and descriptions published in this valuable work; having before glanced over its contents as far as the order Compositæ.

The author now follows the continental botanists, in substituting the name of *Achillea decolorans* (*Schrad.*), in place of *Achillea serrata* (*Retz*), hitherto applied to a very dubious British plant, which is said not to be the species intended by Retz. It is curious that neither the species of Retz, nor the species of Smith, to both of which the name "serrata" has been given, should have any certainly known native country. The former has been very doubtfully located in Switzerland or Siberia; and the latter, in Derbyshire. We do not know how far Babington's second English locality for Smith's species, that of Temple Cloud, Somerset, on the authority of Mr. Flower, can be relied upon as a correct and native habitat.

Filago apiculata (*G. E. Smith*) is not adopted in the Manual. We think this alleged species merits further examination. There can be little doubt that it is really the same thing as *Filago Jussii* (Coss. and Germ.); and the omission of some points from the descriptions of each quasi-species, those which are less variable being retained, might remove the objections against *F. apiculata*, urged in a former No. (See Phytol. ii. 760).

Centaurea nigrescens (Willd.) is adopted for a species distinct from *C. nigra*, and from a variety "radiata" of *C. nigra*. *Centaurea Jacea* (L.) is retained as a British species, also, but the author intimates that he has himself seen no native specimens. This appears remarkable enough, seeing that his friend Mr. Borrer is the authority cited for the occurrence of *C. Jacea* in Sussex. Angus and Belfast are the two other localities indicated; and it would thus appear that the *C. Jacea* occurs in England, Scotland, and Ireland. Is not the plant so called just the same thing as our author's *C. nigrescens*, plentiful in some of the most southern counties of England?

Thrinicia hirta affords an example of the author's resolute adherence to a bad (because very inconstant) character, after its inconstancy has been strongly and explicitly pointed out. The words "involucre glabrous" are reprinted from the former edition, in the specific character of *T. hirta*. This inaccuracy becomes the more likely to mislead, because the variety "dubia" of the former edition, distinguished by having its "involucral scales hairy," is now suppressed, although formerly alleged to be "probably a distinct species." It is curious to find varieties deemed not worth mentioning in 1847, although four years before they had been thought "probably distinct species." We hail these changes as so many indications that the author's taste for species-making has been checked by the freely expressed comments upon that trouble-creating practice. However, the avowed existence of such a variety is sufficient to prove the author's knowledge that the character of "involucre glabrous" was unsound for specific diagnosis; and instances of hairy or hispid involucre are so frequent that any botanist may find them. Why is the inaccurate character reprinted? We can scarcely suppose it to have been done in a spirit of petulant opposition against a critic of the former edition, who questioned the alleged probable distinctness of the variety 'dubia,' because "the involucre varies in all degrees from glabrous to very hairy." And yet this, in connexion with other similar reiterations of errors, almost justifies such an answer to the query.

In the troublesome genus *Hieracium*, the species of which are yet so imperfectly ascertained and agreed upon, wide differences of opinion may be expected to prevail, not only between different botanists, but even with the same botanist at different times. The two editions of the Manual are illustrations of the latter; changed names and changed views of species occur to an extent which Vestigians might hail as an indirect evidence that perfectly definite species have no existence out of books, or in them either. *H. nigrescens* (Willd.) is now adopted

as an ascertained British species, and the figure of *H. pulmonarium*, Eng. Bot. 2307, interrogatively referred to as a representation of it. We believe this to be correct, as was (first, we think,) announced in the 'Phytologist' two or three years ago. In place of *H. sylvaticum* (Sm.) we now find *H. vulgatum* (Fries); although we do not understand the grounds upon which Smith's name for his well known plant has been thus cashiered to make room for another. The *H. diaphanum* (Fries) of the former edition is subdivided into two species, and the name of *diaphanum* dismissed; *H. Lawsoni* (Smith) being resumed as a specific name for one of the two, and *H. Schmidtii* (Tausch) being conferred upon the other. If we understand the plant intended under this latter name, we can quite concur with the author of the Manual in again separating it from *Lawsoni*, and not (as done by Fries) referring to it for Smith's *pulmonarium*. But our plant comes very near to *murorum* and *sylvaticum*; as also is the case with another dubious Highland plant, apparently unnoticed by the author of the Manual, which may be the *H. incisum* (Hoppe). The flowers of *H. Lawsoni* are said to be "cream-coloured;" though to our eyes they are of a bright yellow inclining to lemon-colour, and as little meriting the term "cream-coloured" as any of the indigenous species. We do not see how *Lawsoni* and *Lapeyrousii* are to be distinguished; since two or three leaves added upon the stem of the former, below its branches, appears to make it into an example of the latter. *H. rigidum* ("Hartm." Fr.) of the former edition is now split into two species; namely, *H. tridentatum* (Fries) and *H. rigidum* (Fries). As a counterbalance to the increase of species by these "splits," we find the *H. sabaudum* (L.) and *H. boreale* (Fries) of the earlier edition re-combined into a single species; the latter name being retained for the united brace. This is going back to the 'English Flora,' with a change of name from *sabaudum* to *boreale*. They are, however, still described as two subordinate forms; the fruit of *boreale* being called "dark brown or nearly black," and that of *sabaudum* "usually red." Such differences are scarcely more than those of age; the fruits of many *Hieracia* running through the stages of pale green, yellowish, red, mahogany, brown, blackish, in their advance to maturity. We happen to know that practical botanists of many years' experience, found great difficulty in applying to their specimens the names and descriptions of the *Hieracia*, as given in the former edition of the Manual; and the following tabular comparison of the names here mentioned may therefore prove useful. It will, at any rate, afford an useful lesson on the uncertainty of our present nomenclature, which will undergo yet other changes.

<i>First Edition.</i>		<i>Second Edition.</i>
<i>sylvaticum</i> (<i>Smith</i>)	=	<i>vulgatum</i> (<i>Fries</i>).
<i>diaphanum</i> (<i>Fries</i>)	=	{ <i>Schmidtii</i> (<i>Tausch</i>). <i>Lawsoni</i> (<i>Smith</i>).
<i>rigidum</i> (" <i>Hartm.</i> ")	=	{ <i>tridentatum</i> (<i>Fries</i>). <i>rigidum</i> (<i>Fries</i>).
<i>sabaudum</i> (<i>L.</i>)	}	= <i>boreale</i> (<i>Fries</i>).
<i>boreale</i> (<i>Fries</i>)		

In *Erica* the author still retains his own pet, "*E. Mackaiana* (*Bab.*)," as a genuine species; and he still omits to notice at all the equally remarkable Cornish variety, alluded to in the 'British Flora.' This omission will not elevate the author's reputation as a man of science; and it is only in its bearings upon science that we here mention the point. The *Mackaiana* (*Bab.*) has the leaves of *ciliaris*, with the flowers of *Tetralix*; while the *Watsoni* (*Benth.*) has the leaves of *Tetralix*, with flowers like those of *ciliaris*. The existence of these two crossing varieties, as they may be termed, lessens the probability that either of them is a true species. It is therefore remarkable to find only the one, which our author stands sponsor for, considered to be deserving of notice in the Manual. But there is doubtless truth in the adage which predicts strangulation to a dog with a bad name; and the Cornish heath may possibly have received a name not acceptable to the author of the Manual; having been described in De Candolle's *Prodromus* under the name above mentioned. Both varieties, in their extreme forms, do look very like species; but the links of connexion with *Tetralix* are so close as to render their distinctness very questionable, to say the least.

In *Orobanche* several changes occur. The species which English botanists have hitherto designated "*O. major* (*Linn.*)" is re-named "*O. rapum* (*Thuill.*)," on faith of *Fries*, who deems the Linnean *O. major* to be our *O. elatior*. *O. barbata* ("*Poir*") of the former edition now appears with the substituted name of *O. Hederæ* (*Duby*), in consequence of *Koch* stating that the English species is not the true *barbata*. The Rev. Mr. Hore's Cornish plant is adopted as a species, under the name by which it has been already recorded in the 'Phytologist,' that of *O. amethystea* (*Thuill.*). Another species is added under name of *O. arenaria* (*Bork.*), about which we must venture to remain a little sceptical. The alleged "*O. lucorum* (*Braun*)" is not noticed as a British plant.

Primula vulgaris and *P. veris* are still retained for distinct species; nor can we censure this continued separation of two quasi-species which have several characters of dissimilarity so strongly marked.

Supposing the specific identity of these two to be made certain, and necessarily admitted by botanists, we might question twenty thousand other presumed species. The English name "oxlip" is incorrectly given to the *Primula elatior* (*Jacq.*); for English rustics intend the umbel-bearing varieties of *P. vulgaris* by that name.

In *Euphorbia* we have a change which seems more likely to increase than to remove error and confusion. The two names of 'stricta' and 'platyphylla' are both adopted; the former for the Monmouthshire species, and the latter for the ordinary corn-field species. But the corn-field plant having been figured in 'English Botany,' and described by Smith, under name of *stricta*, the application of the same name to a different species was far from advisable. And it is contrary to the author's practice in other very similar instances; for he rejected Don's name of *Alchemilla argentea*, and substituted that of *Alchemilla conjuncta* (*Bab.*) instead, on the ground that the former name had been applied before (although improperly) to *A. alpina* (*Linn.*). Is it not equally true that the name of "stricta" had been before applied to *E. platyphylla*?

Parietaria officinalis (*L.*) is divided into *P. erecta* (*Koch*) and *P. diffusa* (*Koch*). In this, and numerous similar cases, it really appears the more judicious course to sink an earlier name which includes two or more species, and may be applied indifferently to either. But we think it fair and proper to remind the author of the Manual, that he is himself here following Koch in a course very similar to that in which he refuses to follow Newman; whose specific names for the *Lastreæ*s he rejects, although proposed on the only sufficient reason which can be assigned by Koch for discarding the name of *P. officinalis*; that is, its applicability alike to several species.

In *Potamogeton*, contrary to expectation, we find the species standing nearly as in the former edition. *P. compressus* ("L.") is recognized for a species apart from *P. pusillus*, which is probably a correct view. In the former edition two forms of *Zostera marina* were slightly mentioned; and a third is now added, the addition of which renders their characters less apparently clear on paper. All three are now described for species, as before intimated.

Eleocharis uniglumis (*Link*) is an added species, stated to have been found by Dr. Dickie, in Aberdeenshire; also in the isle of Lewis. This species so closely resembles the *E. multicaulis* (*Smith*), as to suggest the possibility, if not probability of their identity. The essential distinction is found in the three stigmas of Smith's species, and we have occasionally only been able to detect two in dried spe-

cimens, in the same spike with other fruits bearing three. But in such cases there is difficulty in feeling certain that one of them had not broken close off.

In *Carex* the changes are proportionally not numerous, though confusing enough. The rather frequent Highland plant, hitherto considered an alpine form of *C. curta*, is raised to the rank of species under the name of *C. Persoonii* (*Sieb.*). The name of *C. Goodenovii* (*Gay*), adopted in the former edition, is dismissed in favour of *C. vulgaris* (*Fries*), for the well-known *C. caespitosa* of Smith, which is now understood not to be the species so called by Linnæus. In the former edition, this latter name was transferred to *C. stricta* (*Good.*); and Goodenough's name was suppressed. In the present edition, however, the name of *C. stricta* (*Good.*) is again bestowed upon Goodenough's species, and that of *C. caespitosa* (*L.*) is assigned to a third species, not satisfactorily ascertained to be a native of Britain. All this is confusing, but the author of the Manual has simply followed others, and no blame rests with him. The various applications of the unfortunate name to three species may be thus indicated :—

1. *Carex caespitosa*, English Flora.
C. caespitosa, British Flora, earlier editions.
C. Goodenovii, British Flora, edition 5.
C. Goodenovii, Manual, edition 1.
C. vulgaris, Manual, edition 2.
2. *Carex caespitosa*, British Flora, edition 5.
C. caespitosa, Manual, edition 1.
C. stricta, Manual, edition 2.
C. stricta, English Flora; also British Flora, earlier editions.
3. *Carex caespitosa*, Manual, edition 2.
 Not included in the English Flora or British Flora.

In *Poa*, the dubious *P. laxa* of Scotland is subdivided into *P. minor* (*Gaud.*) and *P. laxa* (*Hænke*). The three Parnellian species of the genus are still retained; namely, *montana*, *Balfourii*, and *polynoda*. That Dr. Parnell must have taken much pains with his work on British Grasses, and that his figures are generally very good as representations of plants, we are fully prepared to admit; but we find great difficulty in following his minute divisions into species. If that author believes in the soundness of his own species, as may be safely

supposed that he does, and desires them to be recognized as something better than mere names in books, he would materially promote this latter object by depositing a good series of specimens in London, either in the herbarium of the Botanical Society, or in that of the Linnæan Society. Though a Scottish capital, Edinburgh is only a British provincial town, and cannot be the same available centre for science as the real metropolis of the kingdom.

It has already been intimated that Newman's three species of *Lastrea*,—*spinosa*, *multiflora*, *recurva*,—are adopted in the second edition of the Manual, although none of these names are used for them. The choice between these and the other names retained in their stead, may perhaps be considered optional. It is remarkable, however, that in adopting Lowe's specific name of *Fœniseeii*, for *L. recurva*, the author of the Manual should so put the matter as to virtually say that his book is the first instance of the name *Lastrea Fœniseeii* being applied to the species. Now, Mr. Newman was the first botanist to announce the identity of his *L. recurva* and Lowe's *Nephrodium Fœniseeii* (*Phytol.* ii. 509). But in consequence of Mr. Newman having declined to take up the specific name from Lowe, in preference to his adopted name from Bree, Mr. H. C. Watson subsequently did so, on the ground that established usage required this course (*Phytol.* ii. 568). The word is spelt incorrectly ("fœneseecii") in Mr. Watson's printed paper; but an error of that kind cannot alter the facts of the case. The author of the Manual had the choice between two names, according to ordinary usage and courtesy among botanists, that is, between *Lastrea recurva* (*Newm.*) and *Lastrea fœniseeii* (*Wats.*). He steers clear of the choice by writing "*L. Fœniseeii*; frond triangular," &c., which is exactly equivalent to informing all readers of the Manual, that the author of that book is the first botanist who applies the name "*L. Fœniseeii*" to that species! An omission in this case, and an omission above mentioned in the genus *Erica*, may perchance mutually explain each other. It is with no little regret that we feel justified in hinting this solution; while, of course, admitting that its accuracy cannot be proved.

Notwithstanding some petty blemishes in the Manual, it is an excellent book on the whole, and we shall rejoice to see other successive editions in demand.

C.

Second Notice of a 'Catalogue of Phænogamous Plants and Ferns of Great Britain, &c. &c. By HENRY IBBOTSON.' Part III., 1847.

WE noticed this publication at some length in our No. for December last (Phytol. ii. 688); but we are induced again to call attention to it, under the impression that we may have been prematurely objecting to its plan in one respect. Our objection was taken against the systematic arrangement of the names instead of an alphabetical series, which rendered the Catalogue much less useful as a *dictionary of synonyms*. This defect might be greatly lessened, however, by an alphabetical index to the names and synonyms; and it seems not improbable that the author may intend to add such an index to the work; for another part (the fourth) will nearly complete the list of species, though the work is advertised "to be completed in six Parts." The two remaining Parts might, perhaps, be made to include an *alphabetical* reprint of all the names in the four earlier Parts by printing in close columns.

For the rest, our former comments upon the Catalogue still hold good, without seeming to require any qualification; and, indeed, we are now only making a suggestion as to what should be done, on the chance that the author of the Catalogue himself intended to do this. As in the two former, this third Part has some omissions and some inclusions which we should have preferred not to see. But it is so easy to overlook names and references, so difficult to make sure of all, that a few omissions may readily be excused; for example, that of *Linaria sepium* (*Allman*). The inclusions may be matters of fancy or taste, in a Catalogue which is not one of British plants simply and correctly, but of those reported to be so; otherwise, the introduction of *Cuscuta approximata* (*Bab.*) would have appeared most objectionable. The cocoa-nut has been raised in a flower-pot in England, from imported seeds,—why not include *Cocos nucifera*, and thirty thousand other things, which have as much real claim to be accounted British as the *Cuscuta approximata*? C.

BOTANICAL SOCIETY OF LONDON.

Thursday, June 4th, 1847.—John Reynolds, Esq., Treasurer, in the chair.

The Rev. H. Marsham, of Marsham, Norwich, and Mr. J. W. Rogers, of Duke Street, Westminster, were elected members.

Donations to the library were announced from the Entomological Society of London, the Horticultural Society of Berlin, and Mr. Townley.

Mr. Hewett Watson exhibited some of the specimens which had been received by the Society in the valuable parcels of Azoric plants from their active and esteemed fellow-member Thomas Carew Hunt, Esq., of St. Michaels, Her Majesty's Consul for the Azores. Upwards of forty species have already been added by Mr. Hunt to the list of Azoric plants, enumerated by Mr. Watson in his account of the Botany of these isles, published in 1844. In the last parcel received from Mr. Hunt, early this year, there were a few specimens of *Trichonema Columna*, thus adding another point of similarity between the flora of these isles and that of the South-western counties of England. As far as they have been satisfactorily determined, all Mr. Hunt's additional species (certainly native in the Azores) are described natives of the other Atlantic isles (Madeira and Canary) or of South Europe, with one exception, namely, a species of *Ammi*, which is unlike any of those described in the *Prodromus* of De Candolle, but has the peculiar involucre and the fruit of that genus, as it stands in the work mentioned. Mr. Watson was desirous of recording this new species by the name of its discoverer, who had kindly sent a large supply of duplicates for distribution, under the impression of its being a novelty. He was more anxious to attach Mr. Hunt's name to this plant, because it forms one more in a small group of umbelliferous plants which are characteristics in the Azoric Flora, and which much resemble one another, although unfortunately referrible to three or four different genera, according to the generic arrangement of the species of that order at present in use. One of these he had himself described in the 'London Journal of Botany' under name of *Petroselinum trifoliatum*. A second species probably belongs to the same genus, and has foliage intermediate between the *Petroselinum* and the new *Ammi*; but as Mr. Watson possesses only one immature specimen, he is unable to determine its generic character. A third species is the No. 100 of Mr. W.'s own collection and printed list of Azoric plants, which also remains undetermined, though apparently neither an *Ammi* nor a *Petroselinum*. A fourth species is the new one from Mr. Hunt, and which Mr. Watson proposes to distinguish from *Ammi majus*, by the following character and short description:—

Ammi Huntii (*Wats. MSS.*) Caule glabro striato, foliis ternato-pinnatis bi-tri-pinnatisve, foliolis elliptico-lanceolatis margine carti-

lagineo inciso-serratis, involucri foliolis trifidis pinnatisve, segmentis linearibus subintegris vel lanceolatis inciso-serratis. A. majori propinquum, sed facile distinguendum. Herba forsitan annua seu biennis. Caulis ramosus, ramis divergentibus sive divaricatis. Foliola foliarum inferiorum ampla, 2-3 poll. long. et 1-1½ poll. lat. Pedunculi petiolis dilatatis et vaginantibus oppositi. Umbellæ generalis radii numerosi (10-20) tenues divergentes. Umbellulæ multifloræ. Corolla parva albida. Habitat in insula Azorica "San Miquel," a clero T. C. Hunt coll. et comm. anno 1846.

Mr. Jasper W. Rogers communicated a paper "On the Potato disease," which led to a long discussion, in which the Chairman, Dr. Ayres, Dr. Cooke, Mr. Taylor, Dr. Bossey, and other members joined.—*G. E. D.*

A numerously attended meeting of the Botanical Society of London took place on Friday evening, at the Society's Rooms, 20, Bedford-street, Covent-garden, for the purpose of further considering the disease affecting the potato—a disease which has unfortunately brought so much calamity on the people—and of hearing a paper read on the nutritious properties of that article of food, by Jasper W. Rogers, Esq., C.E., a gentleman who has bestowed much consideration on the subject. John Reynolds, Esq., Treasurer of the Society, in the chair.

The CHAIRMAN, in opening the business, referred to the importance of the subject, and said that the meeting would feel most happy to hear the results of Mr. Rogers' investigations.

Mr. ROGERS then read his paper, which abounded in statistical details. The paper opened with a reference to doubts which appeared to exist upon the minds of some members of the Society as to the quantum of food and nutriment stated by him in his essays to exist in the potato, when properly cultivated and converted into meal and flour; and proceeded to remark, that to remove those doubts the writer had investigated various authorities, from whose writings he collected the results which he now begged to submit to the attention of the meeting. The meeting would observe that he had carefully abstained from giving his own experiments as to the nutritive matter to be found in the potato when in its proper state of health, although they in some instances even more than bore out the statement he had made. He still adhered to this course, in order that conclusions

might be arrived at upon the investigations made by high established authorities. It had been stated in his essays that one acre of ground cultivated with wheat would produce an average of 1,055 lbs. of dry matter, while a similar extent with potatoes would produce 4,076 lbs., the quantity of nutritious material being —

	In Wheat.			In Potatoes.	
Starch	78·199 p cent.	....	84·077 p cent.
Gluten	17·563	....	14·818
Oil	4·265	....	1·104

These results had been taken from data given by Sir Robert Kane, in his 'Industrial Resources of Ireland,' page 300, in which it is stated, "The following table, collected from the best authorities, exhibits the quantity of actual nutritious material usually derived from an acre of ground :—

Crop.	Weight.	Starch and		Gluten.	Oil.	Total.
	lbs.	Sugar.		lbs.	lbs.	lbs.
Wheat	.... 1,500	.... 825	....	185	.... 45	.... 1,055
Oats	.... 1,700	.... 850	....	230	.... 95	.... 1,175
Peas	.... 1,600	.... 800	....	380	.... 45	.... 1,225
Potatoes	9 tons	.... 3,427	....	604	.... 45	.... 4,076 "

Mr. ROGERS begged it might be borne in mind that the authorities alluded to made their experiments *before* the appearance of the potato-disease, and observed that, in addition, it would be found in Wakefield's publications—and his experience was most considerable as an English agriculturist—per statute acre in Ireland was, in 1812, wheat, average, 1,300 lbs. ; maximum, 4,200 lbs. Potatoes, average, 13,669 lbs. ; maximum, 72,100 lbs. Divide the quantity of potatoes by four, and it would give the actual dry material; the nutritious matter, therefore, was—the average, 3,417 lbs.; the maximum, 18,025 lbs. ; while of wheat (bran and pollards included) the average was but 1,300 lbs. ; the maximum, 4,200 lbs. Consequently, the maximum quantity of nutritious material of potato is, according to Wakefield, about $4\frac{1}{2}$ times as much as the maximum weight of wheat unground. Professor Solly gives—wheat, the average, 1,680 lbs. ; potatoes, 17,920 lbs. ; Professor Lowe gives—wheat, the average, 1,380 lbs. ; potatoes, the average, 17,920 lbs. Professor Johnstone—wheat, the average, 1,440 lbs. ; the maximum, 4,200 lbs. ; potatoes, the ave-

rage, 13,440 lbs.; the maximum, 67,200 lbs. The two latter publications were of 1843, Wakefield's being 1812, still the test of dividing the produce from potatoes by four would produce about the same results as the table he had given from Sir Robert Kane's computation. Now, as regarded the amount of absolute nutrition, that table states it exhibits "from the best authorities the quantity of actual nutritious material usually derived from an acre of ground." It might be presumed the table itself was sufficient authority; but all doubt would be removed by the following:—M. de Lomes, author of the 'Statistics of Great Britain and Ireland,' states "In Ireland the potato gives an annual produce of 42 to 52,000 lbs. per hectare. On dividing that number by four, to reduce it to the standard nourishment which wheat affords, the hectare thus cultivated, gives 10 to 13,000 lbs. weight of subsistence;" and he adds, "Newnham considers three pounds of potatoes equivalent to one pound of wheat." Kortes states the main result of the examinations of fifty-five varieties of potato, gave him, for solid matter, 24·9; for starch, 11·85 per cent.; consequently the residue was almost 14 per cent. And Professor Solly, in his 'Tables of the average weight per acre of thirteen crops of corn or vegetables, and also of their organic or inorganic constituents,' gives—

Crop.	Per Acre.	Unazotized Organic Matter.	Protein Compounds.
Wheat....	1,680	1,184·4	218·4
Potatoes	17,920	3,053·6	433·7

And, although Solly only allows eight tons of potatoes per acre, in place of what may be produced, thirty tons, and gives a much higher average of wheat than other authors, we find the gross quantity of protein compound from an acre of ground, to be from potatoes almost exactly double the quantity from wheat, and the per centage to be 14·16, almost similar with Sir Robert Kane's table; besides which, Solly gives six per cent. of inorganic matter. Therefore there can be no question of the quantum of nutriment (assumed to be for the production of bone and muscle) in the potato when in its healthy state; but let them now look at the *last* analysis made, when of course the tuber was diseased, as, under existing circumstances, it could hardly fail to be otherwise. Professor Johnson says, in an article recently published, with an accurate analysis of the potato, "The quantity of dry solid matter depends upon ripeness—the ripest leave 30 to 32 per

cent. dry matter, the least ripe 24; starch varies from 14·08 to 20·71 per cent.; fat 24 to 1; protein compound, in wet state, maximum, 3·75 per cent. Thus giving 15 per cent. protein compound in the dry material. He adds, "In potatoes attacked with the prevailing disease, the proportion of protein compounds diminishes; they are partially decomposed, producing ammonia and other compounds." Also, "The proportion of protein compounds, chiefly coagulated albumen, in the potato fibre, is greater, one would suppose—the main being found by Fromberg to be $3\frac{1}{2}$ to 4 per cent. The fibre of the potato, as he had already said, retained a protein of starch and other nutritive matter, and, therefore, the real quantity of indigestible fibrous or woody matter, is by no means so great as the per centage of fibre appears to represent." Thus it was clear that the quantity of protein compounds in the potato was much above what had been generally supposed; and it was to be recollected that *the whole dry matter* of the potato was capable of being converted into a food for man, was more fitted for storage than the great portion of the dry matter of wheat—*bran*—was lost; and the principal proportion of the flour of wheat now used does not contain more than about 10 to 11 per cent. of the protein compounds, while the best flour would not average 9 per cent. He (Mr. Rogers) would therefore strongly urge on the Botanical Society of London the absolute duty, incumbent upon all at the present juncture, particularly those to whom the public look for instruction and guidance, to thoroughly investigate the question, and pronounce a public opinion upon it. For the last few years it had been the fashion to cry down the potato, and absolutely recommend its abolishment; but the fallacy had been sadly proved, and they should now seek to ascertain its real value. To his theory of the cause of the disease of the potato, viz., "Constitutional weakness, caused by unnatural growth in the pit, and that weakened and degenerated parentage must produce diseased offspring," he would request attention and investigation; also to the remedy, namely, "To sow when nature sows in autumn, and to re-invigorate the weakened seed, by giving freely to the soil, carbon; and let it thus draw back, at once, means to reproduce the life-blood it had lost."

Mr. Rogers's paper was throughout listened to with attention. A long and animated discussion followed, in which Dr. Ayres, Dr. Bossey, Dr. Cooke, and other members, joined. Various donations were announced, and members elected; and thanks having

been voted to Mr. Rogers for his paper, and to the Chairman, the business terminated.—*Morning Advertiser*, June 6, 1847.

Addenda and Corrigenda to Mr. Buckman's 'Flora of Cheltenham.'

By CHARLES PRENTICE, Esq.

WILL you oblige me by inserting in the 'Phytologist' the following Addenda et Corrigenda to the local 'Flora of Cheltenham,' which was published in 1844, by Mr. Buckman.

ADDENDA.

1. *Ranunculus parviflorus*, L. In the steep sandy lane leading from the greenway to the hills behind the house, Shurdington.

2. *Cardamine amara*, L. Wet meadow at Witcomb.

3. *Sinapis muralis*, Br. (*Diplotaxis*, D. C.) Right hand side of the Gloucester road, six miles from Cheltenham; also on walls at Gloucester.

4. *Geranium Pyrenaicum*, L. In the same lane where *Ranunculus parviflorus* is found; only in one spot, but there plentiful.

5. *Myosotis cæspitosa*. Near the pond at the park, and also at Charlton.

6. *Verbascum Blattaria*, L. I found two specimens of this plant in waste ground about Sandford fields, near Cheltenham.

7. *Mentha rubra*, L. (*Mentha sativa*, β . *rubra*, D. C.). Banks of the Chelt, Sandford fields, but only in one spot.

8. *Nepeta cataria*, L. Leekhampton Hill.

9. *Rubus rhamnifolius*, W. et N. (*R. nitidus*, β . *rhamnifolius*). Hewletts Hill, on the Cheltenham side of Shackwell turnpike-gate.

10. *Hypochaeris radicata*, L. Doubtless accidentally omitted by Mr. Buckman from his Flora.

11. *Salix aquatica*, Sm. (*S. cinerea*, β . *aquatica*). Common in damp woods in the neighbourhood.

12. *Salix acuminata*, Sm. Hedge bank in the Hewlett's road.

13. *Salix aurita*, L. In the same situations as *S. aquatica*, not unfrequent.

14. *Carex digitata*, L. Cleeve Hill, sparingly.

15. *C. dioica*, L. Seven Springs, Naunton, on the Stow road.

16. *C. flava*, L. In the same locality.

17. *Aira præcox*. Accidentally omitted.

18. *Festuca duriuscula*, L. Accidentally omitted.

19. *F. loliacea* (*F. pratensis*, *B. loliacea*). Damp meadow at Shurdington.

20. *Brachypodium sylvaticum*, Beauvois. Doubtless accidentally omitted by Mr. Buckman.

21. *Brachypodium pinnatum*, Beauv. Plentiful in the hilly meadows bordering the Charlton Hill road.

CORRIGENDA.

Fedia carinata, Stev. is certainly not common all over the Cotswolds, in cultivated fields (Flora, p. 11.), though *Fedia dentata* is, indeed more so than *F. olitoria*.

Thlaspi perfoliatum, L. is, I am sorry to say, not *now* to be found either at Hartford Bridge or the quarries near Naunton Seven Springs, or Wells, as they are indifferently called.

Phleum Bœhmeri, L. is certainly not to be found near Cheltenham.

Phleum asperum is not to be found either at Marl Hill or Bays Hill, the localities indicated for it and *P. Bœhmeri*, by Mr. Buckman.

Cerastium arvense, L. is mentioned in conjunction with *C. vulgatum* and *C. viscosum*, as common in similar localities with those two very abundant plants. *C. arvense* is, however, rare in the vicinity of Cheltenham, and I know of but one locality for it, viz., the hedgebank bordering the Stow road, about ten miles from Cheltenham, left hand side going to Stow.

The Canadian *Symphoria racemosa* (*Xylosteum tataricum*, *Pursh*), is rapidly becoming naturalized in this neighbourhood, thriving prodigiously where employed as a fence, as has been the case in several instances.

CHARLES PRENTICE.

1, Oxford Villas, Cheltenham,
June 13, 1847.

Occurrence of Rare Plants near Jedburgh.

By ARCHIBALD JERDON, Esq.

I HAVE lately found two or three rather rare plants, a short notice of which may not be unacceptable to the readers of the 'Phytologist.'

About the middle of April I discovered two patches of the yellow star of Bethlehem (*Onithogalum luteum*) by the side of the Jed, near the old castle of Ferniherst, about two miles from Jedburgh. It was growing around the roots of trees, and consequently in a shady situation. The soil is somewhat sandy.

In the beginning of this month (May) I met with a patch of *Lathræa squamaria*, growing in sandy soil, at the root of an elm, by the banks of the Jed, about a mile above Ferniherst. This is the only time I ever saw this curious plant, which is very uncommon here.

The bitter cardamine (*Cardamine amara*) grows in some abundance in marshy spots, and on the banks of the Jed, near Ferniherst castle.

ARCHIBALD JERDON.

Lintalee, Jedburgh,
27th May, 1847.

On the Occurrence of Carex elongata in Essex.

By THOMAS BENTALL, Esq.

I AM not aware that *Carex elongata* has been hitherto recorded as an Essex plant. It therefore gives me pleasure to state that it was found some time since in one of the Mark's Hall woods, near Coggeshall, by my friend Mr. Varenne, of Kelvedon. In a recent excursion to these woods, made by Mr. V. and myself, we were fortunate enough to discover two new stations for it, in one of which, a small bog, it occurs in some abundance, growing vigorously amidst a profusion of *Menyanthes trifoliata* and *Eriophorum polystachion*. A short distance from the last-mentioned spot we also gathered *Lonicera caprifolium*, which we were pleased to find in so interesting a locality.

THOMAS BENTALL.

Halstead, June, 1847.

Occurrence of Cynosurus echinatus and Alopecurus arvensis near Manchester. By LEO. H. GRINDON, Esq.

CYNOSURUS echinatus is now growing in abundance in a field of *Lolium perenne*, at Hough End, two miles south of this town. The seeds have clearly been brought with those of the *Lolium*. *Alopecurus arvensis*, a rare plant in this neighbourhood, is equally abundant.

LEO. H. GRINDON.

1, Rosamond St., Manchester,
June 11, 1847.

Note on raising Primulus from Seed. By JOSEPH SIDEBOTHAM, Esq.

I WAS glad to see in the last month's 'Phytologist' an account of Mr. Watson's further experiments on the specific identity of the primrose and cowslip, as I think the records of such experiments tend more to the true knowledge of the relation of plants to each other than whole volumes of speculative discussion. For my own part, I do not relish the idea of the cowslip and primrose being considered forms of the same species, it appears to strike at the very root of our notions of specific identity, and to give a good handle to the supporters of the progressive-development theory; but if the idea turns out to be a correct one, it would be absurd to attempt to prove it an impossibility. With regard to the first of Mr. Watson's experiments, I consider it only to prove that the seed of a hybrid is fertile, and think that the differences in the seedlings are accounted for by my late friend E. S. Wilson (Phytol. ii. 378). The second experiment certainly shows that seeds of the cowslip produced varieties approaching the primrose, but still that is not satisfactory. Perhaps Mr. W. will favour us with particulars of the remaining seedlings when they flower.

For several seasons I have tried experiments, but from some cause or other the results were not very satisfactory. In 1845 the seeds of *Primulæ* ripened very imperfectly, and I was unable to collect sufficient from the plants which were marked. Last year I secured seeds of the cowslip and primrose: the young plants of the former were almost all killed during the winter, and the few of the latter which have flowered produced common primroses. I also sowed some seeds of the Bardfield oxlip, which produced their like.

This season appears peculiarly favourable to the ripening of seeds: I have fine plants of the cowslip and var. *intermedia*, transplanted from the fields last summer, from which I hope to procure a plentiful supply.

I wish all your readers who feel interested in the inquiry would try the experiment, that next year we may be able to have this knotty question, which has been so long contested, finally settled.

JOSEPH SIDEBOTHAM.

Manchester, June 14th, 1847.

[We have lately had an opportunity of observing seedlings produced in the second and third generation from *Primula Jacquinii* (Newm.), or Jacquin's *Primula*, and find that they are in all respects

identical with the parent plant. We again express a hope that the names of *elatior* and *oxlip* will not be applied to this species.—*Ed.*]

Surrey Natural History Society.

At the monthly meeting of the Surrey Natural History Society, held at Guildford, on Thursday evening, the 6th inst., Mr. Alexander Irvine exhibited living specimens of *Lathræa squamaria*, from Inwood copse, on the north side of the Hogs-back, being parasitical upon the roofs of the elm: Mr. H. Bull first discovered this station in the spring of 1846.

Mr. J. D. Salmon presented dried specimens of *Malaxis paludosa*, from the bogs on Puttenham common, adjoining Hampton Lodge, being the first notice of its occurrence in the county of Surrey.

Mr. J. R. Capron stated that he would at the next mothly meeting read a paper upon fresh-water Algæ, and exhibit some microscopical illustrations collected from the immediate neighbourhood.

J. D. SALMON.

Godalming, June 16, 1847.

Remarks on Cnicus Forsteri (Smith). By DAVID MOORE, Esq.

In the 'Phytologist' for this month, your correspondent "C." in his notice of the second edition of Babington's 'Manual of British Botany,' starts a query of some importance in reference to *Cnicus Forsteri*, namely, supposing that plant a hybrid, which two of our British species are we to suppose the parents? A similar idea occurred to me some years ago, when I collected *C. Forsteri* in the north of Ireland, in two separate localities, and in both instances growing in company with quantities of *Cnicus pratensis* and *Cnicus palustris*.

I then adopted Mr. Borrer's original view in considering it a hybrid production between those two species, which it appears exactly intermediate with, but now, after having a considerable degree of experience with the plant in a cultivated state, I feel more doubtful on this subject, for the following reasons. The plants, which were brought from the natural habitats, produced *some fertile seeds* in the Botanic Garden, the following year after they were planted, from which young plants were raised, *precisely resembling the parent in every way*, and the experiment has been several times repeated with the same result. I brought *C. Forsteri* hither from a marshy meadow

near Coleraine, in June, 1839, and it has been continued under cultivation ever since, by raising two or three sets from seeds. These plants appear to decline during the third year, when they would probably die out if not renewed from seeds, though this may depend considerably on the rather dry situation where they are planted in the garden.

A very large portion of the florets constantly prove barren, but fertile seeds occur sparingly, and are to be found when carefully looked for. These facts, although calculated to strengthen the idea of *C. Forsteri* being an original species, are not by any means in themselves sufficient to prove it so, because, every observing cultivator must be aware, that hybrids produced between plants which are supposed to be specifically distinct, do occasionally produce fertile seeds. A stronger argument against *C. pratensis* being one of the parents, would probably be, that *C. Forsteri* does not partake in any degree of the extensively creeping root of the former species.

D. MOORE.

Glasnevin, June 16, 1847.

The Cholera versus the Vastator, or an Entomologist in the Potato-field.

"TO THE EDITOR OF THE TIMES.

"SIR,—As your journal has contained a number of articles upon the potato disease, in which it has been attributed to the attacks of Aphides; I beg to request the insertion in your paper of the following observations relative to its re-appearance, at a moment when the generally healthy appearance of the crops and the singular absence of Aphides might induce a false security and lead to irremediable evils; and which are an abstract of a paper read by me at the Linnean Society, on Tuesday, the 15th inst.; my object being to disprove the assertion which has been circulated by Mr. Alfred Smee, with so much activity, that the disease has been entirely produced by the attacks of a species of Aphid.

"The arguments I adduce in opposition to this theory are—

"1. That the Aphid which has been found upon the potato, and thence considered as the cause of the disease, is neither a newly created nor a newly imported species, but was well known long before the disease in question appeared.

"2. That the disease itself has not been known until the last few years.

"3. That the disease may occur independent of Aphides.

"4. That Aphides may abound on a plant without producing the real disease.

"5. That the results produced by the attacks of Aphides upon a plant are of a widely different character from those exhibited by the plants attacked by this disease.

"6. That the disease in question may appear in the offspring of a sound parent tuber; and

"7. That the disease appears in many respects to be analogous to the cholera, and may thence, for the sake of distinction, be termed the potato cholera.

"The facts already before the public fully confirm these arguments, which are corroborated by other circumstances which I have noticed within the last few days in my own kitchen-garden in Hammersmith, and which are briefly as follows:—

"On the 4th inst., a few plants were observed sickly in appearance, with the leaves drooping and yellow in colour; the remainder of the crop having a remarkably healthy appearance and being singularly free from insects of all kinds.

"On taking up these drooping specimens, the haulm or stem for about two inches below the surface of the ground was found to be dried and shriveled up in appearance, and of a dirty brown colour; whilst the tuber from which it had sprung, and which had been set entire last autumn, was still found perfectly sound, thus proving the absence of disease inherited from the parent plant. With the exception of these few plants the entire crop retained its healthy appearance until Sunday afternoon, the 13th instant, when a great number of the plants in two of the beds were observed flagging, just as though they had been trampled over by dogs, which has since been followed by the same appearance in other parts of the garden. It is proper here to state that no attempts had been previously made to rid the plants of insects, nor had the ground received other than the ordinary treatment; the last year's crop in my garden having been singularly free from disease. On examining some of these plants on the following morning, the haulm below the surface of the ground was found to present the same dried, withered, and discoloured appearance as in the specimens examined ten days previously; the fibres of the roots being likewise dry and incapable of performing their proper functions, and which would produce discoloured blotches on the leaves in a subsequent stage of the disease. The plants at the same time were free from insects, and the parent tuber remained in several

of them, to all appearance, as sound as when first planted. A number of the plants thus attacked were exhibited to the meeting.

"This sudden drooping of so many of the plants, which up to that time had appeared so healthy, led to the examination of some of those which still remained erect, when it was found that even some of these presented precisely the same appearance as those which had dropped, and which would doubtless in a few days have shared the same fate as the others. Nothing, therefore, can be more fallacious than to depend upon the present general healthy appearance of the crop throughout the country or its freedom from Aphides. The theory of Mr. Alfred Smee is, as that gentleman is well aware, rejected by every zoologist and botanist of distinction in London, and its reiteration at the present critical moment is a gross attempt to mislead the public, and may be productive of the greatest evil by inducing security (owing to the absence of Aphides), until too late in the season to remedy the evil.—I am, sir, your very obedient servant,

"JOHN O. WESTWOOD,

"Secretary of the Entomological Society.

"St. Peter's, Hammersmith, June 16."

[Although there is nothing new in this letter except the absurd attempt to quash enquiry by comparing the disease to cholera, and thereby leading readers to suppose that it is not to be arrested; yet it does contain the united verdict of all zoologists that the Aphis has nothing whatever to do with the disease: it is quite certain that a potato plant on which an Aphis or a lady-bird or any other insect happen to be crawling may die of this disease, but no tittle of evidence is adduced to show that the Aphis or lady-bird caused the death: the house in which Mr. Smee is residing may fall, but he were a bold man that should assert that Mr. Smee's presence caused that fall: no one should write on this subject who has not the intellectual power of correctly estimating facts: nor should any one publish without a previous knowledge of the habit of potatoes generally, and of the difference of varieties. Mr. Westwood's potatoes with drooping and yellow leaves were individuals of an early variety accidentally mixed with the rest in setting them, since the appearance he describes indicates nothing more than an advance towards maturity. The drying, shriveling, and turning brown of the stem below ground, point plainly to such a conclusion: where are the blotched and fungus-infested plague-spots of the leaf? where is the rot in the stem? where the rot and discoloration of the tuber? We wish people would learn before teaching.—*Ed.*].

On the Melanism or Abnormal Colouring of Ferns.

By EDWARD NEWMAN.

I HAVE not seen, as far as I recollect, any comments on the striking and often beautiful colouring to which the fronds of ferns are liable. In some instances the veins assume a tint approaching jet black; in others they are of the most exquisite purple, the leafy portion of the frond remaining of a vivid green: to this description of melanism our British *Lastræa recurva* and the exotic *Cyatheæ* are peculiarly liable. A second phase of the property exhibits the leafy portions of a dull purple, the veins retaining the normal green hue: our British *Cystopteris fragilis* affords frequent examples of this. In a third phase the leafy portions assume a resplendent purple, or glittering bronzed appearance, the veins partially partaking of the same character: beautiful examples of this are exhibited by our common *Polystichum aculeatum*.

It has frequently struck me that the truthful discrimination of species might be occasionally retarded by the presence of this character in a hastily gathered frond of an exotic species, so completely does it alter the appearance of the fern: and I therefore thought I might be adding my mite to the general stock of knowledge if I could show how so marked a deviation from normal character is occasioned. With this view I this year watched my ferns very narrowly, and during the usual period of their expanding not an instance of melanism occurred: I however happened to procure some roots of *Cystopteris*, the fronds of which had been so injured in transit that I thought it best to cut them off, and to plant the roots without fronds: I watered the spot night and morning, and the plants being full of vigour, new fronds were unrolled and rapidly assumed a normal size and appearance: I should say that the spot on which they grew enjoyed one hour of the midday sun. One morning, circumstances occurred to delay the morning watering until near noon; it was a brilliant day; the air still, and the sky cloudless; after the lapse of a few minutes the sun was shining on the young fronds of *Cystopteris* still dripping with moisture: the evaporation was most rapid, and the vapour might be seen curling up over the bricks among which the roots had been planted. On the following morning the young fronds of *Cystopteris*, together with those of a *Polystichum* which had partaken of the sun and water, had become purple, they looked as though died in log-wood. Thus the melanism was produced by natural agents although one of them artificially applied. In ten days both the ferns had

developed other fronds; the weather was cold and cloudy, and I also manufactured an artificial shade, so that they had no sun at all: in both species these fronds have retained a vivid green colour, and thus the same plants of different genera are now bearing fronds of the most opposite colours. A series of experiments has convinced me that this result is not accidental but always attainable under proper management.

EDWARD NEWMAN.

Suggestions for recording the Localities and Distribution of British Plants. By HEWETT C. WATSON, Esq.

IN the 'Phytologist' for May (Phytol. ii. 924), Mr. Newman has called attention to the services which might be rendered to science, "by inserting in the pages of the 'Phytologist' a record of careful observations on the range of British species, and more particularly of those which Mr. Watson has included in his first volume," that is, of the 'Cybele Britannica.' I beg here to offer ~~some~~ further suggestions on the manner of carrying forward this recommendation into a practical result; and to explain how much many of the past and present very inadequate attempts might now be improved upon.

The great impediment in the path of improvement is obvious enough. It is to be found in the undeniable fact, that most botanists are in such haste to publish their own individual observations, in form of local lists and localities, that they will not wait until they have first ascertained the doings of others in the same line. They appear tacitly to assume that the facts which are new to themselves must be novelties also to the records of science, and worthy of public announcement. The consequence of this tacit assumption, without taking the trouble to inquire into its soundness, is seen in numerous records and announcements of little or no value, which have occupied the pages of periodicals more or less during the past twenty years. The same localities, for the same species, have been announced and recorded over and over again; local lists, professedly of "rare plants," have abounded with the names of generally-distributed species, while those of much more limited species have been omitted therefrom; important deficiencies in our information on the ranges and limits of species have not been filled up by those botanists who had the opportunity and the willingness to do this, lacking only the requisite

knowledge that such deficiencies existed; and, in short, the published local lists and localities have usually been drawn up at random, with reference to no higher or more general object than the announcement of so many isolated facts, valuable or valueless, as chance might turn out.

And yet all this time, there were probably few of those botanists who did not enjoy some opportunities for observing and recording facts which would have proved really and importantly conducive to the progress of science, if they would have only taken the pains to make those preliminary inquiries which qualify scientific observers to discriminate between the important and the unimportant, the useful and the useless, in science. It must be allowed, however, that some of the necessary data for this sort of preparatory or preliminary knowledge have hitherto been so scattered and imperfect, that much time and patience might be requisite in order to acquire it. But in other instances no such difficulty stood in the way; the data having been readily accessible and sufficient—but neglected.

The Botanist's Guides will illustrate this. The original Guide, by Turner and Dillwyn, has been forty years before the public; and it is now a dozen years since the 'New Guide' was published. Nevertheless, we still find botanists recording over again, *as if novelties*, the very same localities which were entered in the older Guide, on competent authority, and again confirmed in the 'New Guide,' on the additional evidence of other observers. It would be too much to expect that every botanist, fancying himself the discoverer of a locality new and worth recording, should make certain that the same locality is not anywhere in print, before he sends his own announcement thereof to a periodical. But it might very reasonably be expected from those who are pretending thus to instruct others, that they should at least take the trouble of consulting such general works as are *most likely* to show whether the fact has been already recorded on sufficient authority. A refusal or neglect to do this approximates so closely upon injustice to their predecessors, that the separation is imperceptible, if existent at all.

The meanest botanist would see the inutility of now sending a letter to the 'Phytologist,' in order to announce the discovery of *Erica ciliaris* in Cornwall. Why so? Simply because that fact is already sufficiently established and recorded. And yet we constantly see announcements that a certain species occurs in a certain county, or parish, or other more local habitat, although the same fact has been previously recorded on superior authority. I do not hesitate to write

“superior authority;” because it is usually the smatterers in botany who indulge in recording the old localities over again; some of them, it may be, in innocent ignorance that such books as *Botanist’s Guides* have ever been published.

Much has been done during the past ten years in the way of ascertaining and recording localities; and the *Botanist’s Guides* have doubtless fallen in arrear as general compilations. But still, as far as they do go, they would save us from a vast deal of useless reiteration of well-established facts, if they were more usually consulted by our hasty recorders of localities. So, again, with the *London Catalogue of British Plants*; which has placed within the reach of every botanist such a test of the comparative frequency of our native species as may enable them to discriminate between the rare and the common plants, with at least sufficient certainty for avoiding unnecessary records of localities for species of general occurrence.

A difficulty yet remains. While the use of a *Botanist’s Guide* and a *London Catalogue* might often save us from the infliction of “old over again,” or of unimportant facts not worth recording, they may still not show, with sufficient clearness for beginners, what facts bear an opposite character—what may be best worth recording on the ground of their novelty, of their tendency to correct errors, or of aught else which may give some scientific value to them. It is principally with a view of offering some suggestions on this head, that I have now taken pen in hand. To point out the right track, and the path of real usefulness, may prove a more successful effort towards leading others from the wrong way than any attempt to impede their course along the latter. In doing so, I must take it for granted that botanists who seek to record their own observations in Nature, are influenced chiefly by two motives; first, a desire of contributing something to the accumulated stores of scientific knowledge; secondly, such a feeling of personal satisfaction as any one may very justifiably entertain under the consciousness of having thus usefully employed himself. But the egotistic individual, who only obtrudes on the public with his repetitions of things trite and trifling, neither adds to our stores of knowledge nor employs himself usefully. I address myself to the former, not to the latter class of botanists; and I am satisfied that there are many of the former among the contributors to the ‘*Phytologist*.’

A new edition of the ‘*Manual of British Botany*’ has very recently been published. It is likely that a new edition of the ‘*London Catalogue of British Plants*’ will be required before next year. Mr.

Ibbotson's Catalogue is far advanced towards completion. We thus have, or shortly may have, three very full lists of British plants; each bearing some feature which is not found in the other two. And it seems almost needless to say that the discovery of any species at all wild in the British Isles, which is not enumerated in the above lists, would be a fact highly worthy of public announcement and record. Many species are mentioned in the Manual, as likely to be found in Britain, and some of which are conjectured to have been seen, although not certainly ascertained. Attention is thus directed towards points which it is desirable to investigate and ascertain. And, by giving a census of the species, the 'London Catalogue,' in its turn, is drawing attention to those species, the scarcity of which renders the discovery and record of all their localities so much the more desirable. These are finger-posts to guide the botanical traveller.

In recording localities, as above intimated, there is always a chance, usually a probability, that we are only again putting on record the selfsame facts which had been before ascertained and recorded. To keep clear from this impertinent egotism in science, it would be well to take the trouble of first inquiring whether the same facts have, or have not, been already placed on record by others. The Botanist's Guides offer a ready resource here, and afford a passably safe test. In many instances, a still better may be found in some local Flora for the county or tract within which the supposed new localities are situate. If not found on record either in the appropriate Flora or in the Guides, the publication of such localities would be quite excusable, even though it might prove to be only a re-publication, though an earlier record in some less likely work.

The use of local Floras may sometimes lead to the preservation of facts doubly useful and worthy of record, and which might be neglected and lost by those who failed to examine such works. Including some catalogues in the periodicals, together with those published separately as local Floras, there are now about forty printed lists of plants which profess to include all the known species of the several counties or other tracts to which they refer respectively. In these lists, consequently, we have the negative as well as positive evidence to work upon; for any species which is not enumerated in the appropriate Flora, is reasonably enough presumed to be absent from the corresponding tract of country. In divers instances, however, these lists have been hastily published, that is, before their authors had fully examined the tracts to which they relate; and they may thus mislead by the imperfect state of their negative evidence. Any

omitted species which may be subsequently discovered within the same tract, thus becomes doubly worthy of being recorded; its discovery not only adding a positive fact to the sum of recorded knowledge, but also correcting the negative error implied in the omission of that species.

In the Botanist's Guides the lists do not profess to be complete; being simply compilations of such localities for the rarer species as had been ascertained at the dates of publication. It does not appear that in the first Guide any fixed list or choice of species was uniformly adopted; a species which was included in one county list being excluded from another. The negative evidence is thus vitiated, and even rendered nugatory for several of the less rare species. In the 'New Guide,' on the contrary, a fixed list of species was adopted uniformly for every county, the localities of the same plants in each successive county being entered as far as known. The omission of any of the species from any county list was thus equivalent to an intimation of no locality for that species, in that county, having been found on record or otherwise ascertained. To a considerable extent, therefore, the county lists of the 'New Guide' may be held to point out what was unknown as well as what was known, at the date of publication. Here, again, the discovery of any omitted species may be said to have a two-fold value and claim for public announcement; first, by adding another locality for that species; secondly, by adding another species to that county list. It would be easy to show that numerous localities published in the 'Phytologist' do truly come under this head of double value, although intermingled with others of no value.

In 'Remarks on the Geographical Distribution of British Plants,' the ranges of latitude and elevation were given, as well as various other items of information connected with the distribution and localities of all the known British species. Any locality discovered higher or lower, more north or more south, than the limits there assigned to the species, might thus at once be pronounced a positive addition to the sum of our ascertained knowledge; and, as such, might fairly be deemed worthy of record. I shall, however, not dwell on the 'Remarks' here, but pass to the 'Cybele Britannica,'—the work which has led to my offering the present suggestions, through Mr. Newman's (I may be allowed to say, judicious) note on the same subject. I wish to show from that work what ample opportunities still remain within the reach of our botanical explorers, for bringing fresh supplies of useful facts to the already accumulated stores, and without

incurring the discredit of announcing over again those facts which are already well known.

As explained in the 'Phytologist' for April (Phytol. ii. 784), the counties of Britain are grouped into eighteen provinces, in the Cybele. The occurrence or non-occurrence of each species, in each of these eighteen provinces, is shown; and if reported to grow there, its condition also, whether indigenous or introduced, or doubtful from some source of error or uncertainty. At present only the first volume of the Cybele is published, which includes nearly six hundred species, reckoning varieties treated as such, doubtfuls and aliens, along with the rest. Six hundred multiplied by eighteen gives a total of 10,800 facts, positive and negative. More than the half of these facts are positive; and as the condition under which the positive fact (to wit, the alleged occurrence of the species in the province) is viewed, is likewise to be added, we shall be below truth in saying 15,000 facts, under this head of provincial distribution alone. I use the term "facts" because they are set forth as such. But owing to imperfect records, errors, and various other circumstances, there is reason to suppose that many of these reputed facts do truly require to be differently stated. For instance, various species may hereafter be found to grow in provinces which are at present set down as blanks for them. Others may be found really wild in provinces where they are now entered as introduced or naturalized, and *vice versa*. Others may be ascertained to grow in provinces where as yet they are entered under suspicion of error. Any discovery of a locality or species which will correct any one of the reputed 15,000 facts, must be deserving of announcement and record. Any such discovery which may simply add to the evidence either way, in cases of uncertainty, although without being conclusive in itself, will most likely be also worth recording. By the time the Cybele is completed these 15,000 reputed facts will have accumulated into 50,000; and little indeed must be his knowledge of British *botany* (whatever he may know of British *plants*) who shall find himself unable to make a single correction, or to give some useful item of information towards correcting some of these 50,000 reputed facts. In this light, it is to be remembered, that localities for quite common species may be equally useful as those for the rarest.

In the same work, the most northern and the most southern counties, in which each native and perfectly naturalized species has been ascertained, are also mentioned. In the one published volume these species (with varieties treated as species) amount to about five hun-

dred. And as, one with another, about five counties are named for the north and south limits of each, we have 2,500 additional facts; which, again, will rise to 8,000 by the completion of the work. These are given according to present knowledge; but there is a probability, equal to a moral certainty, that several of the species will be discovered in counties more northerly or more southerly than those now set forth as their ascertained limits; and where this may be the case the discovery will be worth recording. It will be a fresh fact added to our stores of knowledge; and one of considerably higher value than the discovery of any additional locality within the known limits of the species.

Again, in the same work, the north and south limits are also indicated by lines of latitude. Here, then, we have another thousand facts, that is, a thousand lines on the map, beyond which the species are stated respectively not to be known in a truly wild state. On completion of the work these will have become 3,000 reputed facts. In this case, the likelihood of corrections becoming necessary is much less than with the county limits. Still, it is far from improbable that some of the species may hereafter be found beyond the lines indicated for their latitudinal limits in Britain. Any observed fact in proof of this extension must be worthy of record: it is another item to the sum total of knowledge, and one which immediately admits of useful application.

The upper and lower limits of the several species are also stated, so far as ascertained, both in absolute altitude and in accordance with certain zones of climate and elevation (*Phytol.* ii. 785, 794). To perfect this part of the work a vast number of additional observations will be required. Many of the species may yet be found higher or lower than the altitudes assigned for them. And the heights to which they ascend or descend on the different mountain ranges should also be ascertained and compared in order to afford the necessary data for determining the influence of latitude, and numerous more local conditions, in elevating or depressing the limits of the species. As the matter now stands, the first volume of the *Cybele* may be said to give 2,000 facts under the head of altitude; and these will become 6,000 in the entire work.

Besides the preceding points, there are the types of distribution; the ranges of mean annual temperature; occasional enumeration of counties or localities for the rarer species; their usual situations of growth; their claims to be ranked as natives or otherwise; their estimated census, with various queries and suggestions; including toge-

ther many thousands of other apparent facts, more or less definitely and positively set forth in the Cybele. Many of these also will doubtless need to be confirmed, modified, or corrected, by advancing knowledge, derived from fresh observations, — from fresh facts which have *yet* to be ascertained and recorded.

It is hardly necessary to say more upon this (with myself) rather egotistical subject. Enough has been said for my immediate purpose of showing, that those botanists who may be disposed to observe and record facts bearing upon local and geographical botany, may find ample scope and opportunity for making them *real and useful contributions to the stores of scientific knowledge*. But they will not succeed unless they can go to work with some reference to that which has been done by others. They must take the trouble, and it would surely not be a great trouble, to ascertain from the general works and compilations, first, *what is known*, and secondly, *what is not known*. He who will not take this trouble, but will prefer to publish his lists or localities at random and in ignorance, may chance to put on record important facts, without knowing them to be such; but there is a greater probability of his putting forth much more that is only old and worthless.

The suggestions of Mr. Newman referred to local and geographical botany; and to that I have accordingly directed also my own. But this is only one field. Mr. Babington or Mr. Borrer might as readily show that many facts have yet to be ascertained, many questions to be answered, many doubts to be removed, in the department of descriptive botany, even in that of Britain. Mr. Wilson or Mr. Henfrey might point out how numerous and important are the matters which require to be studied and settled in physiological botany; and still by appealing to Nature for fresh facts, or by re-examining old facts under new conditions. Mr. Berkeley or Dr. Harvey might expatiate on the ample field for novelty which cryptogamic botany spreads out before those who will turn their talents in that direction. In short, while the opportunities are constant and innumerable for ascertaining new and useful facts, it is merely wasting time and trouble, to print the trivial or to reprint the trite.

HEWETT C. WATSON.

Thames Ditton, June, 1847.

*A List of Rare Plants found in the Neighbourhood of Breadsall,
Derbyshire. By MR. JOSEPH WHITTAKER.*

- Thalictrum flavum.* Banks of the Derwent.
Ranunculus auricomus.
 ——— *arvensis.* Corn-fields, abundant.
 ——— *sceleratus.* Sides of ditches, rare.
Papaver Argemone. Corn-fields, common.
Chelidonium majus. Rare.
Corydalis claviculata. Damp, shady places, Breadsall Moor.
Fumaria capreolata. Rare.
Coronopus Ruellii.
Iberis amara. Sandy field by the Derwent, not rare.
Lepidium campestre. Corn-fields, on gravel.
Armoracia rusticana. (Not indigenous).
Cardamine amara. Abundant.
Nasturtium sylvestre. Common.
 ——— *amphibium.*
Reseda Luteola. Banks of the Derwent.
Viola palustris. Wood at Allestree, very rare.
 ——— *odorata.*
Lychnis vespertina.
Arenaria rubra. Common.
Cerastium aquaticum. Ditches, common.
 ——— *arvense.* Breadsall Moor, rare.
Hypericum hirsutum.
 ——— *humifusum.*
 ——— *pulchrum.*
 ——— *perforatum.*
Geranium pratense. Meadows, common. A white-flowered variety occasionally occurs.
Rhamnus frangula. Breadsall Moor. First found by Mr. H. H. Crewe.
Ulex nanus. Breadsall Moor, abundant.
Genista Anglica. Breadsall Moor, very rare.
 ——— *tinctoria.* Common.
Melilotus officinalis.
Lotus major.
Ornithopus perpusillus. Rare.
Orobis tuberosus. Common.
Prunus insititia. Hedges.

- Geum rivale*. Plentiful in a bog.
Rosa rubiginosa. Rare.
 ——— *arvensis*. Common.
Sanguisorba officinalis. Meadows, abundant.
Poterium Sanguisorba.
Alchemilla vulgaris. Rare.
Epilobium angustifolium. Plentiful in one station, Breadsall Moor.
 ——— *hirsutum*.
 ——— *tetragonum*.
Lythrum Salicaria. Ditches, common.
Bryonia dioica. Hedges, common.
Ribes rubrum. Banks of the Derwent.
 ——— *Grossularia*. Woods, Horsley Castle.
Saxifraga granulata. Hedge banks, rare.
 ——— *tridactylites*. Roofs and old walls.
Chrysosplenium oppositifolium.
Adoxa moschatellina. Not common.
Cornus sanguinea.
Pimpinella magna.
Silene pratensis. Not uncommon.
Torilis nodosa.
Galium cruciatum.
Valeriana dioica. Marshy places, common.
Fedia olitoria. Rare.
 ——— *dentata*. Abundant.
Dipsacus sylvestris.
Scabiosa succisa.
Helminthia echioides.
Lactuca muralis. Duffield Bridge.
Hieracium umbellatum.
Cichorium Intybus. Very rare.
Serratula tinctoria. Rare.
Centaurea Cyanus. Corn-fields, Breadsall Moor.
 ——— *Scabiosa*. Holbrook.
Gnaphalium sylvaticum. Road-sides on the Moor.
Pulicaria dysenterica.
Campanula latifolia. Shady places, common.
 ——— *Trachelium*. Rare.
 ——— *hybrida*. Corn-fields, common.
Jasione montana. Coxbench.

Vaccinium Myrtillus. Breadsall Moor.

Erythraea Centaurium.

Verbascum Thapsus. Rare.

Veronica montana. Damp, shady places, common.

———— *Anagallis*. Ditches.

———— *polita*. Corn-fields, not common.

Linaria Cymbalaria. Old wall, Coxbench.

———— *repens*. I gathered this plant by the road-side, near Hill Top, July, 1845.

Verbena officinalis. Little Chester.

Lycopus europæus. Canal banks.

Origanum vulgare.

Lamium Galeobdolon. Common.

Calamintha Acinos. Holbrook.

Myosotis palustris.

———— *cæspitosa*.

———— *sylvatica*. Kedleston.

Symphytum officinale. Banks of the Derwent.

Pulmonaria. By the road-side between Duffield and Kedleston.

Hottonia palustris. Common.

Lysimachia vulgaris. Damp places, rare.

———— *Nummularia*. Do. do.

Plantago media.

Euphorbia exigua.

Parietaria officinalis.

Humulus Lupulus. Hedges, abundant.

Orchis Morio.

Crocus nudiflorus. Meadows, Derby.

Narcissus Pseudo-Narcissus. Woods, Coxbench, abundant.

Galanthus nivalis. Hedge banks.

Allium vineale. Meadows.

Paris quadrifolia.

Colchicum autumnale. Meadows, abundant.

Alisma Plantago.

Butomus umbellatus.

Potamogeton pectinatus.

———— *lucens*.

Arum maculatum.

Eriophorum polystachion.

Scolopendrium vulgare. Very rare.

Ophioglossum vulgatum. Damp meadows, abundant.

JOSEPH WHITTAKER.

Vernal Appearances at St. Bees, Cumberland.

By E. J. R. HUGHES, Esq.

IN fulfilment of my promise of the 8th April I send you the continuation of my observations of natural phenomena. I have occasionally given the *habitat* of a plant, especially if it is not *very* abundant in our immediate neighbourhood, *i. e.* within a circuit of four miles.

APRIL.

5. Dog violet (*Viola canina*) first in fl.
6. Wild white sweet violet on a bank ten yards this side of Far Preston Howe farm, the only locality where I have yet met with it.
- „ Blackthorn (*Prunus spinosa*) first in fl.
8. Crab (*Pyrus malus*) leaves first open.
9. Hazel (*Corylus avellana*) leaves first open.
- „ Moschatell (*Adoxa moschatellina*) in fl.
10. Crown imperial in fl.
15. Blackthorn (*Prunus spinosa*) leaves first open.
24. Thrift (*Statice Armeria*) first in fl.
- „ Sea campion (*Silene maritima*) first in fl.
28. Woodruff (*Asperula odorata*) in bud, nearly open.
30. Kerria Japonica first in fl.
- „ Laburnum leaves first open.

MAY.

2. Whitethorn (*Crataegus oxyacantha*) first in fl. Not generally in bloom till a fortnight after.
4. White meadow saxifrage (*Saxifraga granulata*) first in fl. Stone wall, Stamford Hill, on cliffs a little beyond St. Bees light-house, and on banks of Keekle beck.
11. Oak (*Quercus Robur*) leaves first open.
14. Earthnut (*Bunium flexuosum*) first in fl.
15. Lilac first in fl.
- „ Ash (*Fraxinus excelsior*) leaves first open.
- „ Field dock sorrel (*Rumex acetosa*) first in fl.
- 18 Hydrangea first in fl.
19. Tulip in fl.
- „ London pride in fl.
20. Early purple orchis (*Orchis mascula*) in fl., abundant.

21. Creeping cinquefoil (*Potentilla reptans*) first in fl.
22. Syringa first in fl.
24. Laburnum in fl. at Sandwith.
 - „ Forget-me-not (*Myosotis palustris*) first in fl., Bardmouth wood.
 - „ Bird's foot trefoil (*Lotus corniculatus*) first in fl.
 - „ Kidney vetch (*Anthyllis vulneraria*) first in fl., abundant on cliffs, Salton Bay and near Fleswick.
25. Grass vetch (*Lathyrus nissolia*) first in fl.
 - „ Mountain ash in fl.
 - „ Red clover (*Trifolium pratense*) first in fl.
27. Broom (*Genista scoparia*) first in fl.
 - „ Water avens (*Geum rivale*) in fl. on banks of Keekle beck.
28. Ragged robin (*Lychnis Flos-cuculi*) in fl. Abundant on cliffs from Salton pit to Bardmouth wood, in a field on the right of White-park woods, and moist hedge banks, Summer Grove.
 - „ Shepherd's purse (*Capsella bursa-pastoris*) in fl.
 - „ Rhododendron in fl.
29. Guelder rose first in fl. in garden.

JUNE.

2. Yellow avens (*Geum urbanum*) first in fl.
 - „ Wild Angelica (*Angelica sylvestris*) first in fl.
 - „ Yellow rattle (*Rhinanthus crista-galli*) in fl.
4. Bullrush in bud, nearly expanding.
 - „ Azalea in fl.
 - „ White clover (*Trifolium repens*) in fl.
9. Guelder rose, wild (*Viburnum opulus*) first in fl., White-park woods, wood on right-hand of New Road, and Minehouse brow continuation.
 - „ Raspberry, wild (*Rubus idæus*) in fl.
11. Stinging nettle (*Urtica dioica*) in fl.
12. Foxglove (*Digitalis purpurea*) first in fl.
 - „ Ragwort (*Senecio Jacobæa*) first in fl.
 - „ Elder (*Sambucus nigra*) in fl.
18. Dog rose (*Rosa canina*) first in fl.
19. Honeysuckle first in fl.
 - „ Blackberry (*Rubus fruticosus*) in fl.
 - „ Harebell (*Campanula rotundifolia*) in fl. Not yet abundant.
 - „ Yellow vetch in fl., but not generally.
 - „ Willow herb (*Epilobium hirsutum*) first in fl.
 - „ Dyer's weed (*Genista tinctoria*) first in fl.

22. Strawberry (*Fragaria vesca*) ripe.

This spring, as contrasted with the last, has been rather a backward one, the flowering of plants especially has been later; the primrose, it is true, was in fl. earlier, but the dog violet 25 days later, honeysuckle nine days, wild guelder rose in full bloom fourteen days, yellow rattle three days, moschatell two days later, dog rose in full bloom on the 8th June, 1846, first in fl. 18th June, 1847.

E. J. R. HUGHES.

St. Bees, Cumberland,
June 23, 1847.

Observations on the Plants of the Land's End.

By the REV. C. A. JOHNS, M.A., F.L.S.

I HAVE been lodging for the last week in this the most southerly parish of England, and have greatly enjoyed the privilege of wandering at my leisure along the magnificent cliffs of the Lizard, places to which I have often paid hurried visits, but which I have never hitherto had the satisfaction of exploring as narrowly as I wished. I have been not a little surprised to find how very few tourists resort hither, even in the summer; for lovers of the picturesque would here find the grandest rock-scenery of this "rocky land of strangers," and subjects for sketching innumerable; while the geologist would not fail to be interested in the treasures afforded by the serpentine district; and the botanist would nowhere in England have within his reach so many undeniable rarities. *Lotus hispidus* occurs on the cliffs between Penvoose Cove and the Lizard lights, near Kennuck Cove, and elsewhere; *Littorella lacustris* on Grade Downs; *Trifolium Bocconi* in a new station, a rocky mound on the right-hand side of the path between Cadgwith flag-staff and Poltesko Cove; *Thalictrum minus* among bushes on the sand hills at Kennuck Cove; and *Asplenium lanceolatum* with fronds eighteen inches long, in crevices of the rocks at Hot Point. *Asparagus officinalis* is now in perfection in a deep ravine between Cadgwith and the flag-staff, and in sufficient quantities to supply all the botanists in Great Britain. My only difficulty was to select specimens small enough to dry. I also found it in profusion among the precipitous rocks under the Rill; but this station being more exposed to the sun than that at Cadgwith, the flowers had withered, and I could only discover one specimen with

berries. This is also the best station for the very elegant but ill-savoured *Allium Schœnoprasum*, which grows in tufts in the scanty soil afforded by the cracks of the rocks. *Trifolium Molinerii* is to be found at intervals along several miles of the coast between Cadgwith and Kynance, and is as undoubtedly wild as *Statice Armeria*, and in some spots quite as abundant. *Exacum filiforme* I found some years ago sparingly on Goonhilly Downs, since which time I have never found it until within the last few days. It is now growing in great profusion in the ruts of the cart road between Kynance and the Lizard-town.

I have been particular in giving the exact stations of these plants in case any botanists should happen to be travelling this way, when they may learn the names of the headlands and coves from any one whom they may meet. I am sorry I cannot offer to supply your correspondents with specimens; for in truth I have been too much occupied with scrambling about the cliffs and boating to give much attention to drying plants. I have, however, pointed out all the stations of the rare plants of the district to an intelligent person residing in the parish, who has already begun to dry specimens, and will at the close of the season supply sets of about thirty-five species at a moderate price. (See advertisement on the cover).

I have been much struck with the remarkable number of leguminose plants growing in this district; the turf on the cliffs is almost made up of them, the grasses, plantains and sedges; I have counted thirty-three distinct species. The effect of the sea-breeze on some of the plants is very singular. *Euphrasia officinalis* rarely exceeds two inches in height, and has thickly-set, decussate, fleshy leaves; *Trifolium repens* is one of the earliest flowers, and has its stems, leaves and flowers closely pressed to the ground; *T. procumbens* has a wiry stem and large flowers; it grows quite erect, and averages a height of about two inches: *Chrysanthemum Leucanthemum* has its leaves and stem fleshy; the latter is rarely more than six or eight inches in height, and sometimes entirely wanting, so that the flower is sessile on the root.

If singular geological phenomena are not excluded from your pages, the following notice may not be without interest. On the eastern side of the Lizard lights a green sward slopes down to the edge of a bold but not very lofty cliff, having on either extremity a point, the Bumble to the south, Ladmakeen to the north. Underneath, a cave washed by the sea, and known by the name of the "Daw's Hugo,*"

* "Hugo is Cornish for a cave.

extends inwards in the direction of the lights. On the night of the 19th of February last an irregularly elliptical piece of ground, fifty or sixty feet in diameter, and at a considerable distance from the edge of the cliff, suddenly, and without giving any previous indication of its being insecure, sank, and formed a rugged hole thirty feet deep. It appears that the roof of the cavern gave way, owing to the looseness of the material of which it was composed: a gentleman who was on the spot the next morning informed me that the sea was tinged for a considerable distance by the red soil which had been dislodged. The depth of the hole is daily increasing; even the last week has made a perceptible difference: and a large mass on the landward side of the hole is becoming detached, and will undoubtedly fall shortly. How near it may come to the light-house is a matter for the calculation of the Trinity-board. What makes this occurrence particularly interesting is, that at Cadgwith, a village three miles to the north, there is an immense funnel-shaped depression in the cliff, into the bottom of which the sea enters every tide under a natural arch-way; and there can be little doubt that this, "The Frying-pan," as it is called, owes its formation to a similar subsidence of the soil into a cave, the sides of which have been in the course of time enlarged by the crumbling of its walls, and the detritus carried out through its mouth. I think it highly probable that another winter will convert the pit under the light-house into a "Frying-pan:" but whether the lights will be endangered must of course depend on the dimensions which it attains. It goes by the name of "Lions' Den."

July 9th.—I have had the good fortune to discover another station for *Trifolium Bocconi*, four miles off from the old Cadgwith station, on a sloping piece of ground near a cove called Cairn William, or Cathillian, between the Lizard Head and Kynance Cove. On the same bank I also discovered in great abundance, but past flowering, *TRIFOLIUM STRICTUM*. So abundant are the Leguminosæ at this spot that I covered with my hat *Trifolium Bocconi*, *T. strictum*, *T. Molinerii*, *T. scabrum*, *T. striatum*, *T. arvense*, *Lotus hispidus* and *Anthyllis vulneraria* var. *Dillenii*. Had the rim been a little wider I might have included *Genista tinctoria* and *Lotus corniculatus*. I have since found *T. strictum* in abundance on the cliff between Pistol meadow and the (old) Lizard Head. I enclose specimens for identification from both localities.

C. A. JOHNS.

Landewednack, near Helston, Cornwall,
July 3rd, 1847.

Seventeenth Meeting of the British Association for the Advancement of Science.

(From the 'Athenæum,' dated July 10th, 1847).

MR. A. HENFREY read a paper on the Structure of the stems of Monocotyledons, in which he came to the conclusion that these stems do not increase by additions to the centre as is ordinarily thought, but, from the structure of Sparganium and other plants, he believed these stems were truly exogenous.

DR. LANKESTER did not think it would be advisable to give up the terms exogens and endogens, although the distinction on which they were originally founded appeared to be erroneous. He was glad to find that Mr. Henfrey's researches confirmed the view of the formation of wood that he had maintained before the Association some years ago.

A paper was read from Dr. ILIFF 'On some Experiments on the Roots of the Canna Indica with reference to their Value in an economical point of View.'—The Dean of Winchester has succeeded in cultivating the Canna Indica in the open air; and upon this fact Dr. Iliff recommends its cultivation in this country for the purpose of procuring arrowroot.

DR. LANKESTER stated that as the value of arrowroot starch was not greater as an article of diet than potato starch, and as its yield of starch did not appear to be so great as that of the potato, it was clear there would be little national advantage from such a proceeding.

Prof. ALLMAN made some remarks on certain peculiarities he had observed in the stomates of *Ceratopteris thalictroides*. He also described at the same time a new genus of fresh-water Algæ.

MR. THWAITES communicated a paper 'On the Structure of Diatomaceæ,' in which he stated that he had observed a conjugation of the frustules precisely similar to that which had been observed in the Desmidiæ and some of the Oscillatoria.

Prof. E. FORBES remarked this fact was of the utmost importance to systematic natural history, as it at once settled the disputed position of these beings in the organized scale, and placed them among plants.

A paper was read from Miss TWINING 'On the British Flora compared with other Countries.'

CAPT. WIDDRINGTON requested that persons travelling in the Ita-

lian peninsula would notice the various forms of oak, and, if possible, procure acorns, and send them to the Horticultural Society or to Kew Gardens.

‘On the Diatomaceous Vegetation of the Antarctic Ocean,’ by Dr. J. HOOKER. — The author found the Diatomaceæ in countless numbers between the parallels 60° and 80° south, where they gave a colour to the sea, and also to the icebergs floating on it. The death of these bodies in the south Arctic Ocean is producing a submarine deposit, consisting entirely of the siliceous particles of which the skeletons of these vegetables are composed. This deposit exists on the shores of the Victoria Land, and at the base of the volcanic mountain Erebus. Dr. Hooker accounted for the fact that the skeletons of Diatomaceæ had been found in the lava of volcanic mountains, by referring to the position of the Diatomaceous deposits in relation to Mount Erebus, — which lie in such a position as to render it quite possible that the skeletons of these vegetables should pass into the lower fissures of the mountain, and then passing into the stream of lava, be thrown out unacted upon by the heat to which they have been exposed.

PROF. ALLMAN made some remarks on the remarkable character of the Diatomaceæ, — showing how, through their siliceous skeleton, they approached the mineral kingdom, — their power of locomotion, the animal kingdom, — and the possession of endochrome, the vegetable kingdom.

Occurrence of Carex montana near Ross.

By W. H. PURCHAS, ESQ.

I AM happy to say that I was fortunate enough last month to discover *Carex montana*, Linn., growing somewhat plentifully in a limestone wood between Tintern and St. Arvans, Monmouthshire. To remove any doubts as to the genuineness of the plant I may state that Mr. Babington is my authority for the name. I was too late in the season (June 17) to obtain any number of specimens, indeed, I could find scarcely any plants which had not shed their fruit. The plant grows in tufts, which appear to me to spring in many, if not in all cases, from a thick, creeping, branched rhizoma.

W. H. PURCHAS.

Ross, July 16, 1847.

Occurrence of Juncus diffusus near Halstead.

By THOMAS BENTALL, ESQ.

It may perhaps interest the readers of the 'Phytologist' to be informed of a new locality for *Juncus diffusus* (Hoppe). Within the last few days I have found it in small quantity by the side of a road near Halstead. It grows intermixed with *J. glaucus*, and not being previously acquainted with *J. diffusus*, I was rather surprised to find the two plants differing so much in appearance; the glaucous, deeply striated stems of the former presenting a striking contrast with the dark green, faintly striated ones of the latter.

Although it is highly probable that *Juncus diffusus* will be found in other localities besides those at present on record, it seems likely to prove a rare species. I have made diligent search for it in many places where I thought it might probably occur, but have never met with it excepting in the spot above mentioned, and even there it grows very sparingly indeed.

THOMAS BENTALL.

Halstead, July 16, 1847.

A few Words on the Potato Crop. By EDWARD NEWMAN.

IMMEDIATELY after the publication of Mr. Westwood's paper in the 'Times' newspaper (Phytol. ii. 889), I wrote to the Editor of that influential journal, stating that Mr. Westwood was entirely in error as to his supposed symptoms of the disease in his potatoes, since the appearances he described were indicative only of approaching maturity. I need scarcely say that my reply was not published: had it been on the alarmist side it would probably have received another fate.

I now wish to express, even at the risk of repetition, my firm conviction that the publication of such papers as those of Messrs. Smee and Westwood do a serious injury to the country. I will not say that Mr. Smee, or Mr. Westwood, or the editors or proprietors of journals, have a direct pecuniary interest in the high price of corn or potatoes: I believe the only motive on the part of writers is the flashy notoriety thus obtained, and that the journalists ever find *their* reward in the promulgation of the alarming or the extraordinary. Newspaper readers don't like the vapid statement that matters are going on well; the most moderate thirst for famines and panics; the

intemperate require murders and burglaries. An editor always announces, with a modest and melancholy air, that "the potatoes *as yet* are perfectly healthy;" that the "wheat *at present* looks unusually well." These announcements are made in his smallest type, and invariably thrust into his most obscure corner. How different when the leaves of a potato flag in the sun, or assume the yellow tint that indicates maturity! Then pour in letters to the 'Cerberus:' then the 'Cerberus' selects its largest type, and its most prominent site: then the 'Pict' reprints them from the 'Cerberus' and the 'Cerberus' reprints them again from the 'Pict'. Like the reverberating echoes of thunder, the report is bandied from paper to paper, from north to south, until its origin is lost sight of altogether. Journalists plead the taste of their readers, and how shall we blame them?

It is, however, for the wise and prudent to examine for themselves: to use their own eyes and their own understandings. When statements appear in the public prints that Mr. Verysoft has pulled up all his potatoes and sowed haricot beans after reading the very able letters of Messrs. Smee and Westwood, there is no real necessity for following so strange an example. A gardener who knew I took great interest in the subject, seriously asked my advice whether he should imitate Mr. Verysoft: "the haulm is laying about," said he, "the leaves are growing yellow, and they are all turning up at the sides."

E. N.—"Now let me inquire what sort of potatoes those are?"

GARDENER.—"Ash-leaved kidneys."

E. N.—"And when ought they to be ripe?"

GARDENER.—"In another fortnight."

E. N.—"And now tell me by what signs can it be known when they are getting ripe?"

GARDENER.—"Oh, the haulm falls about and turns yellow."

E. N.—"Just as in these?"

GARDENER.—"Yes, a good deal like it"—(*a pause, during which I could not help smiling*) "but not so soon though, and Mr. Westwood says the disease comes this way."

E. N.—"I suppose, then, Mr. Westwood is a very great grower of potatoes: a practical man, who has served his apprenticeship to a market-gardener? is that so?"

GARDENER.—"I know not what he is; but the papers make a good deal of what he says. Then a Mr. Verysoft has written a very clever letter to say he pulled up his potatoes because they went so."

E. N.—"And yet Mr. Westwood writes against Mr. Smee, and the papers made a good deal of Mr. Smee a few weeks before."

GARDENER.—“Yes, I recollect that.”

E. N.—“Leave the potatoes alone for a fortnight, dig them at the usual time, and I’ll buy the whole lot if there’s any disease amongst them.”

This man told me eighteen days afterwards that he had housed his ash-leaved kidneys in a better state, and that they had afforded a better yield than during any year since this variety was introduced.

Here was a practical man, a good gardener, yielding his judgment, foregoing the teachings of twenty years’ experience in favour of the crude vapouring of Messrs. Westwood and Verysoft. It is difficult to find words by which to characterize the folly of such people : it is almost enough to make one question the advantage of the printing-press, seeing it circulates such trash over every part of the habitable globe. There are hundreds of people who, like this gardener, are willing to abandon, on an instantaneous summons, their knowledge, their judgment, their common sense, because one or other of these scribes is pleased, in his very ignorance, to issue to the world hypotheses and recommendations which he has never taken the trouble either to examine or test.

The distracted gardeners who read the newspapers over their evening ale, have made a sad onslaught on the poor ash-leaved kidneys this year, on account of the curling leaves, a character by which the variety is especially to be distinguished, a character well known to themselves, and one which three years ago they would have recognized as a virtue rather than a fault. The late frosts of May were also fatal to many patches of potatoes, the poor gardeners resolutely destroying them in consequence of the blackened leaves. But as to that disease which committed such ravages in 1839, and again in 1845 and 1846, I am unable to trace a single instance of its recurrence in 1847 : I have received letters from all parts of the country from those most capable of giving correct information ; and the replies invariably inform me that the potato crop never promised a more abundant harvest. These reports embrace England, Ireland and Scotland. It will perhaps be recollected that last year the earliest positive information of disease was published on the 14th of July ; on the first of August, the day of the great hailstorm in London, the papers were teeming with melancholy and doubtless exaggerated accounts of the progress of the disease ; and on the 11th of August the crop was pronounced a complete failure. How far the report was correct we have had subsequent means of judging.

I think it worthy of remark also that the early varieties of potato,

when harvested last year, had a peculiarly watery and immature appearance when cooked, and were without that solidity which is the usual characteristic of good early potatoes : this year, on the contrary, the early potatoes are unusually good and solid, not only as compared with last year's crop, but as compared with that of preceding years : my attention has been called to this fact by my friend Mr. Cameron, late of the Birmingham Botanic Garden, a thoroughly practical cultivator and acute observer. Thus, as far as past experience and present appearances can guide us in this momentous matter, the prospects for the approaching potato-harvest are peculiarly favourable : the early varieties are already harvested in excellent condition, and the late ones are yet unscathed. The supply is unusually large for the time of year ; and, should we have no more public fasts or famine prayers, to enrich the speculators through the fears of the people, there is every reason to believe that food will shortly be as cheap as it promises to be exuberantly abundant.

EDWARD NEWMAN.

9, Devonshire Street, Bishopsgate,
28th July, 1847.

Researches in Embryology. By W. WILSON, Esq.

(Continued from Phytol. i. 882).

IN all investigations which require microscopic aid, the liability to error is greatly increased when the parts to be examined are very minute and of delicate texture, and so connected with contiguous matter that the attempt to sever them without laceration and distortion is almost a hopeless task. *Researches in Embryology* are attended with peculiar difficulties, and the former parts of this essay will show the expediency of engaging the attentive scrutiny of an additional number of competent observers in order to obtain correct and undeniable conclusions.

My present purpose is to detail the result of an examination of two or three species of gourd, commenced last summer, with all the scepticism natural to one who had been repeatedly baffled in the attempt to ascertain the truth of the alleged fact that the pollen-tube penetrates the orifice of the ovule.

Having obtained favourable sections of the fertilized germen, it

was practicable, by means of careful dissection, to bring into distinct view the apex of the ovule, bearing a tube projecting from the attenuated extremity or neck of the nucleus, and also to ascertain that the tube was continuous with the inflated portion of the neck of the nucleus, lying immediately above the point where the rudimentary embryo first makes its appearance. This tube is in every respect similar to the pollen-tube itself, and I have traced it from the stigma to within a very small distance of the ovule, along the channels of stigmatic tissue which extend to the back of the placenta, which organ, in all probability, constitutes the termination and broadest expansion of the stigmatic tissue. It is certain that a mass of loose tissue, in every respect the same as that proceeding downwards from the stigma, is always found in close apposition with the apex of the ovule, so that the entrance of the pollen-tube may be effected without any specific action of the ovule; but inasmuch as the pollen-tube (if such it be in reality) is frequently swelled out and crooked immediately above its point of insertion into the nucleus, and the apex of the primine, at the period of fecundation, is fringed and gaping (though it is afterwards nearly closed upon the nucleus), it is possible that some action analogous to that of the Fallopian tubes may be excited at the proper juncture. In two instances two pollen-tubes seemed to have reached the ovule, one of them not being inserted into the nucleus, but interposed between the primine and the nucleus. It will still admit of a doubt whether the tube at the extremity of the nucleus be not a prolongation of the nucleus itself, to meet the pollen-tube at some point to which the fertilizing influence is conveyed; for in one particular instance the upper end of the tube proceeding from the nucleus was closed up, and rounded at its extremity, the interior being so full of grumous matter as to bear being cut in two without sensible derangement; and the extremity of the tube was so firmly connected with a number of cellules of stigmatic tissue as to forbid the supposition of any continuity of that tube with any proper pollen-tube above it. With this solitary exception my observations are in accordance with the opinion that the pollen-tube does actually extend to the ovule. Previous to fecundation, the long, slender neck of the nucleus is certainly quite destitute of any tubular centre: a transverse section shows an uniform mass of cellular tissue, containing active molecules, and the apex is compact and entire; but immediately after fecundation it is so loosened as to exhibit a fringed, expanding orifice, with the membranous tube passing down to the bottom of the neck of the nucleus, where it expands to nearly twice the diameter. Usually the

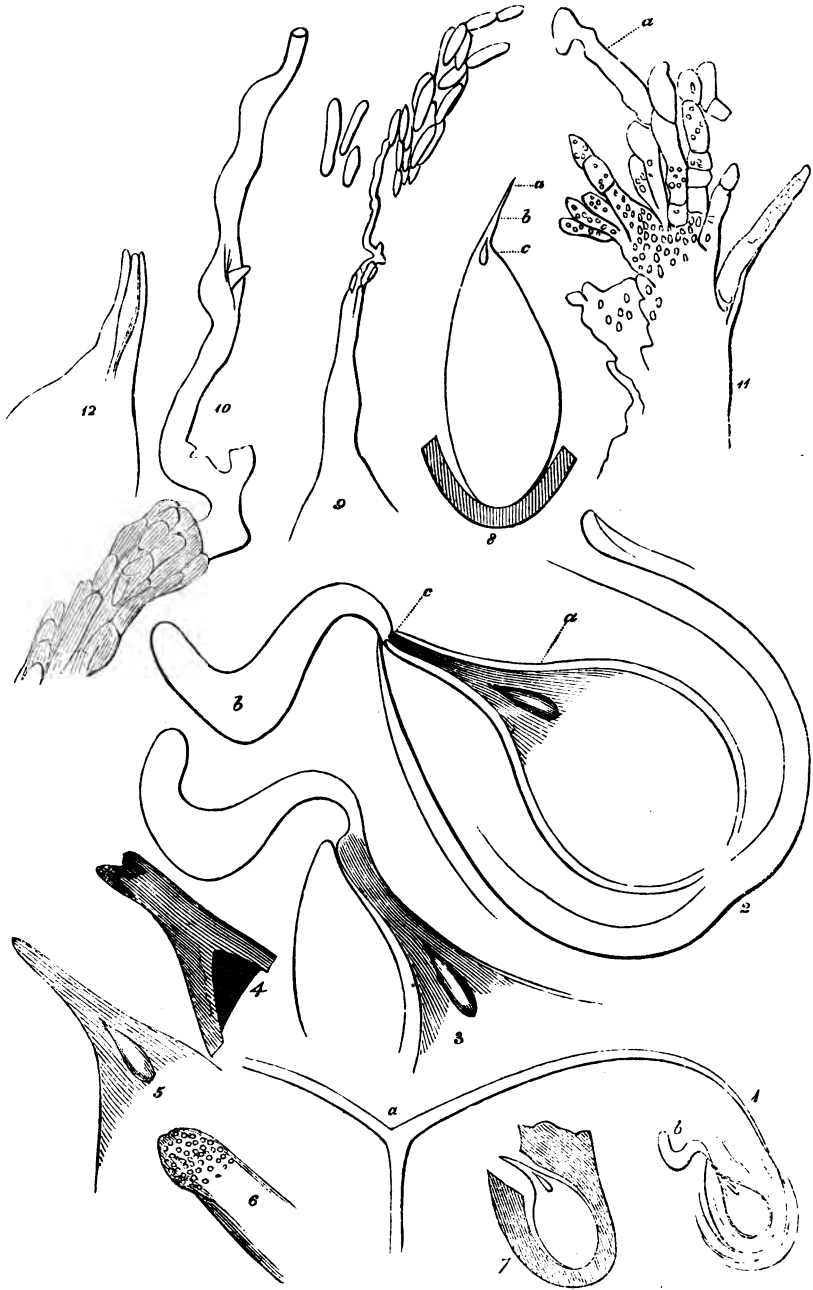
expanded cavity is closely lined with the membrane, a circumstance in favour of the idea that the tube is only an extension from the nucleus; but in two instances, the tube did not expand at the cavity, and seemed to be abortive insertions of the pollen-tube: these, contrary to the usual course, were filled with slightly coloured matter.

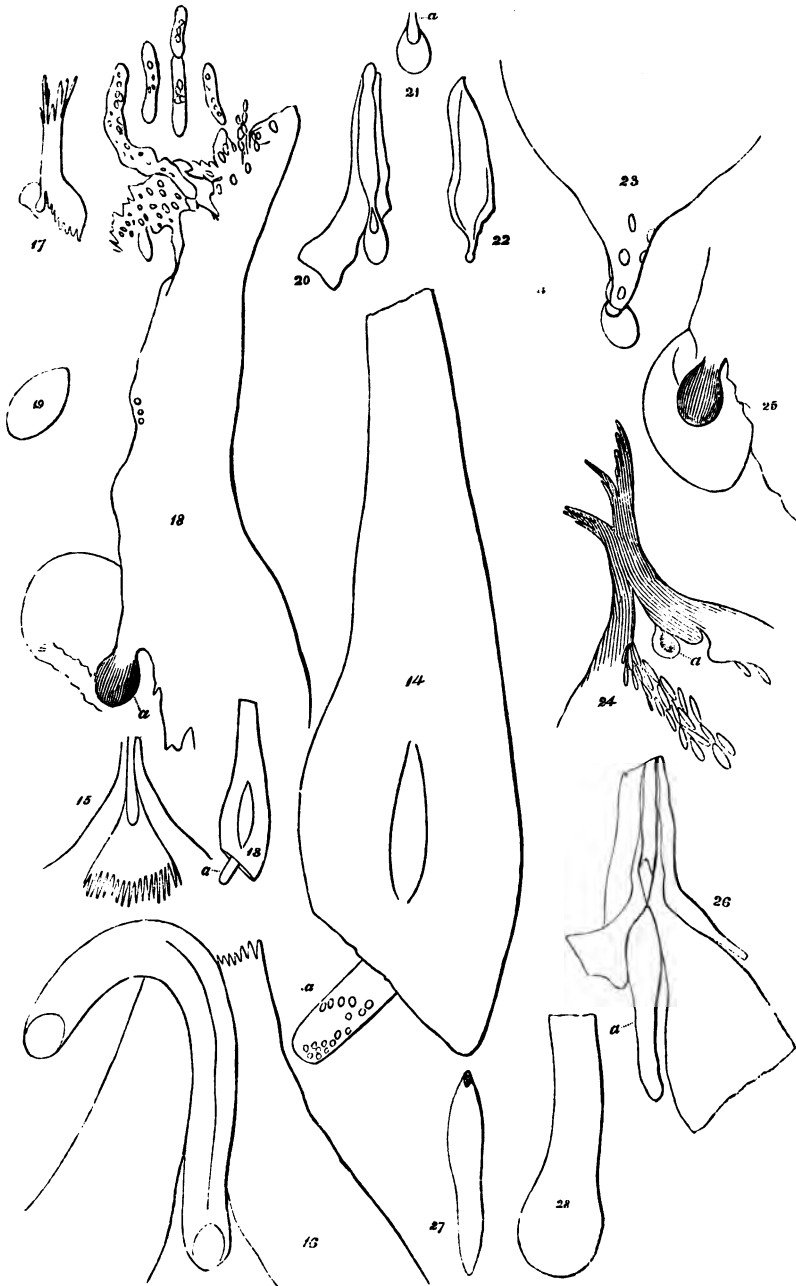
The tubular lining of the neck of the ovule could not, at the time of fecundation, be traced much below the expanded cavity, and the embryo sac, when dissected away, appeared to be quite closed at the top. If it be continuous with the tube, it is natural to expect that, at its first appearance, a very slight pressure would cause the regression of the loose granular matter into the tube; but this does not occur; and if there must be an inflation of the pollen-tube, after its admission within the nucleus, we should rather expect to find it at the point where the embryo sac is formed; but, between that point and the cavity in the neck of the ovule, there is, at the time of fecundation, a sensible barrier of rather compact tissue, through which no tubular passage could at any time be traced. For this reason, I still hesitate to receive the theory of Schleider as being fully proved, though I admit that the evidence in its favour is very much stronger than I anticipated, and indeed all but conclusive; for in a very short time after the insertion of the tube within the nucleus (the time of fecundation) the tube does appear to descend below the cavity; so that either its lower extremity comes into direct contact with the previously existing embryo-sac, or the extremity itself is inflated and converted into an embryo-sac. It is difficult to say whether any amount of skill in dissection will prove which of these interpretations is the true one; and it will be more practicable, and equally satisfactory, to obtain dissections of the ovarium at the precise juncture when the pollen-tube has reached the apex of the neck of the ovule, but has not penetrated so far as the cavity at the base. To this point of the inquiry I would therefore earnestly direct the attention of all who may wish to pursue the subject.

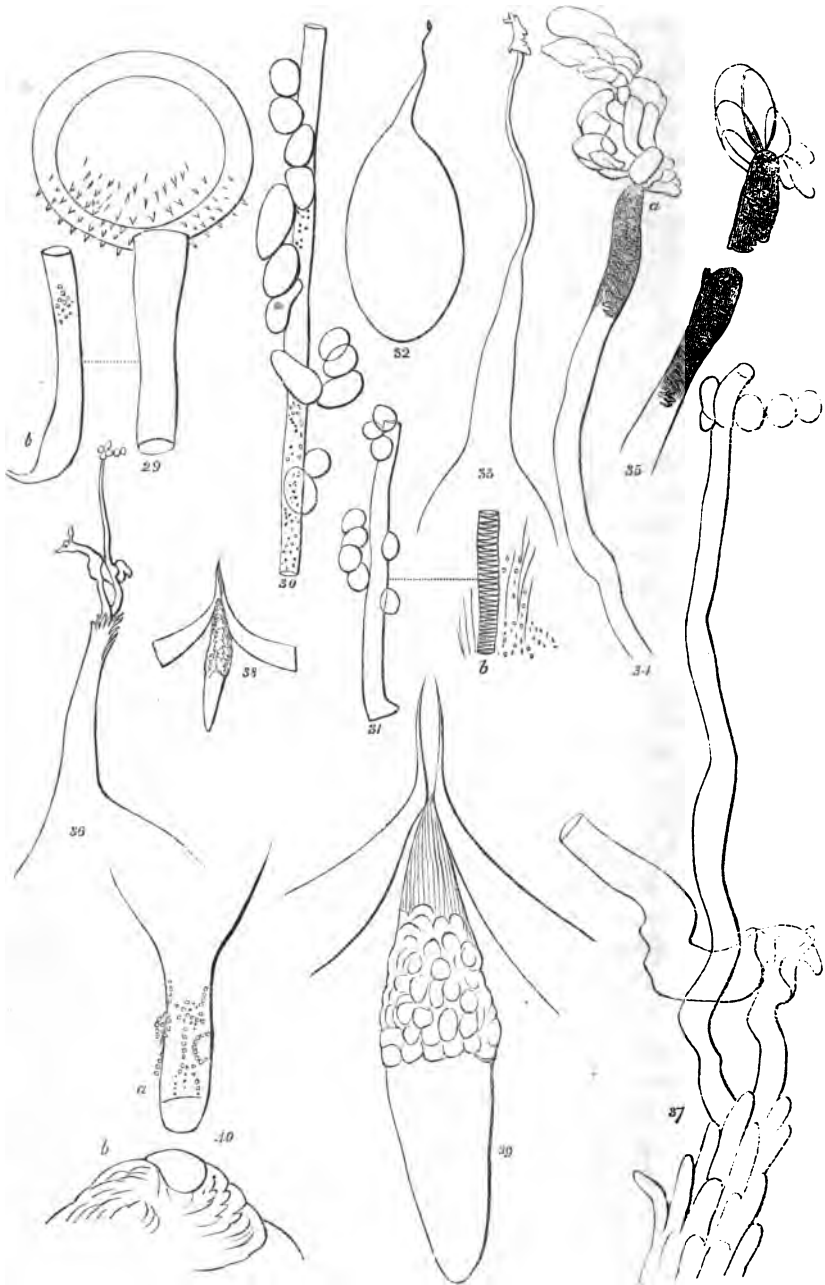
The subjoined figures are taken, in every case, from actual dissections.

- Fig. 1. Section of ovule of a species of gourd, 10 times magnified. *a.* Diverging branches of stigmatic tissue, as seen in a transverse section of the ovarium. *b.* Stigmatic tissue in contact with the apex of the ovule.
- Fig. 2. The same 40 times magnified. *a.* Site of the embryo-sac. *b.* Stigmatic tissue in immediate contact with *c*, the apex of the ovule.
- Fig. 3. Another example of the same.
- Fig. 4. Apex of the primine, showing the foramen of the ovule.

- Fig. 5. Upper part of the nucleus, showing its long, slender neck, and the site of the embryo-sac previous to fecundation.
- Fig. 6. Apex of the nucleus, 240 times magnified.
- Fig. 7. Ovule, partly dissected to show the nucleus, 10 times magnified.
- Fig. 8. Nucleus after fecundation, 10 times magnified. *a.* Pollen-tube. *b.* Cavity at base of the neck of the nucleus. *c.* Embryo-sac.
- Fig. 9. Neck of nucleus, 40 times magnified. Fig. 10. Apex of the same, 240 times magnified.
- Fig. 11. Apex of another nucleus, equally magnified. *a.* Pollen-tube inserted therein. The tissue of the apex of nucleus, unbroken before fecundation (fig. 6) is now much divided.
- Fig. 12. Upper part of another nucleus, a longitudinal section, showing the cavity in the neck, 10 times magnified.
- Fig. 13. Neck of nucleus more advanced (after fecundation), 10 times magnified. *a.* Lower extremity of the supposed pollen-tube. The parts (40 times magnified), are more distinctly seen at fig. 14.
- Fig. 15. Another example; more magnified at fig. 16.
- Fig. 17. Another, still more advanced. Fig. 18. The same, 240 times magnified. *a.* Embryo-sac.
- Fig. 19. Embryo-sac detached from the last example, 240 times magnified.
- Fig. 20. Another example, after fecundation.
- Fig. 21. Embryo-sac, from the last (10 times magnified), showing at (*a*) what appears to be the extremity of the pollen-tube.
- Fig. 22. Another; the base more highly magnified at fig. 23.
- Fig. 24. Section of nucleus, more advanced, 10 times magnified, the lax tissue which surrounds the embryo-sac displaced to show the embryo-sac and its contents: this part is more highly magnified at fig. 25.
- Fig. 26. Upper part of ovule, several days after impregnation, dissected to show (at *a*) the embryo seen detached at fig. 27.
- Fig. 28. Extremity of pollen-tube (or embryo-sac?), as seen several days after fecundation, and at a later stage than the one represented at fig. 14, 240 times magnified.
- Fig. 29. Pollen-grain, with its tube (240 times magnified) with its narrowed lower extremity (*b*) at the distance of six diameters of the pollen-grain, where it was broken off or discontinued.
- Fig. 30. Pollen-tube, as found opposite to the ovarium, with cellules of stigmatic tissue attached to its surface, 240 times magnified.
- Fig. 31. Pollen-tube in the vicinity of the ovules. *b.* A tube of vascular tissue.
- Fig. 32. Nucleus from an advanced ovule (10 times magnified), showing the neck lengthened out into a tube, beyond the foramen of the ovule.
- Fig. 33. Upper extremity of the last dissection, 45 times magnified.
- Fig. 34. Ditto 240 times magnified, showing the *cul-de-sac* termination above (at *a*).
- Fig. 35. Ditto still further dissected, the tube cut through without much displacement of its grumous contents.
- Fig. 36. Ovule, with two supposed pollen-tubes inserted into the foramen, 45 times magnified.
- Fig. 37. Upper part of the same, 240 times magnified.







- Fig. 38. Section of half-ripened ovule, showing the immature embryo, 10 times magnified.
 Fig. 39. Ditto 45 times magnified.
 Fig. 40. Dissection of a similar example, showing the rounded base of the tube (a) after having been detached from the base of the embryo (b), the previous connexion of the two being effected by contact of surfaces of two cellules.

W. WILSON.

Orford Mount, June 28, 1847.

Admeasurement of New Zealand and Norfolk Island Pines.

(Extracted from the 'Proceedings of the Linnean Society').

"Read an extract from a letter addressed by Captain Sir E. Home, Bart., R.N., to R. Brown, Esq., V.P.L.S., giving an account of the measurement of some of the largest of the New Zealand and Norfolk Island Pines. With reference to the former Sir E. Home quotes from the Journal of Mr. Saddler, Master R.N., who was sent to New Zealand in 1833-4 in command of the Buffaloe Store-ship to procure spars for the Navy. The tree which he describes was in a forest near Wangaroa, some miles north of the Bay of Islands. Mr. Saddler says, 'On 16th (May, 1834) I went to examine a Kauri tree (*Dammara australis*, Lamb.) which Mr. Betts, the purveyor, in his search through the forest, had discovered a few days previous; it is situated about two miles from the river, on the steep bank of a ravine. It appeared perfectly sound and healthy, and measured forty-three feet nine inches in circumference, and sixty feet high without a branch. Its head then spread out into forty-one principal branches, some of which were four feet through. It is more than double the size of any tree I have before seen in this country.' Sir E. Home adds, that the largest tree of this species that he saw was only eighteen feet eight inches in circumference; but that in Norfolk Island he had measured the largest tree (of *Araucaria excelsa*, Sol.) known to be upon the island, and had found it to be 187 feet high, the girth at four feet from the ground fifty-four feet, and at twenty feet from the ground fifty-one feet. This tree is hollow for sixteen feet above the ground, but is in good health."

On the Impregnation of Dischidia.

(Extracted from the 'Proceedings of the Linnean Society').

"Read also a paper 'On the Impregnation of Dischidia.' By the late William Griffith, Esq., F.L.S., &c., &c. Communicated by Robert Brown, Esq., V.P.L.S.

"In this paper, dated 'Mergui, March 7, 1835,' Mr. Griffith details a series of observations made in January of that year on *Dischidia Rafflesiana*, Wall. and confirmed (with the exception of those relating to the development of the ovule) by the examination of another species, apparently allied to *D. Bengalensis*, Colebr.

"Mr. Griffith commences by a description of the progress of the ovula from their first appearance as mere rounded elevations on the placenta. The first change consists in a narrowing towards the base, which afterwards puts on the appearance of a funiculus, and at the same time, a rounded, rather shallow cavity appears on the upper edge of the ovulum, close to the funiculus. The further changes take place rapidly; the rounded cavity assumes the appearance of a deep fissure with raised margins, extending from the base of the ovulum, close to the funiculus, along the upper margin of the ovulum for about one-fourth of its length. This fissure gradually lengthens; its lips become more expanded, and a small, indistinct, grumous-looking mass becomes visible in the central line and towards the apex of the ovulum, which is the first rudiment of the nucleus, or of the cavity within which the future embryo is to be developed, and which becomes subsequently more distinct, and frequently assumes a rounded form. In the perfect ovule the fissure is very large, extending longitudinally from the base of the funiculus for about one-third of the length of the convex upper margin of the ovule; its lips are gaping, and it is of considerable depth, gradually narrowing towards its fundus. The grumous mass is now very distinct, and the first indications of an excavation around it are appreciable. When no impregnation has taken place in flowers that have passed their meridian, the excavation is enlarged, the grumous mass is more irregular, and it frequently appears to be broken up, the component parts being irregularly grouped together.

"The partial closing of the corolla of *Dischidia* by the connivence of its divisions, and the short hairs with which those divisions are furnished internally in *D. Rafflesiana*, induced Mr. Griffith to regard

foreign agency as inapplicable in determining the escape of the pollinia from their anthers, and to believe that impregnation in any given flower is in this genus the result of the action of its own pollinia. The pollinia are erect, have no diaphanous margin, and dehisce along that margin which is internal with regard to the cell of the anther, and which presents no appreciable difference of structure, but corresponds with the margin of dehiscence of the pendulous pollinia first noticed by Mr. Brown. The base of the stigma is slightly papillose in *D. Rafflesiana*, and more evidently so in the other species; and the fissures of communication are open in the former, but closely approximated in the latter. In neither has Mr. Griffith seen the pollinia engaged in these fissures, but they are either caught by the processes of the corona or fall to the fundus of the corolla; and in whatever situation they emit their boyaux, the cord formed by the aggregation of the latter always engages itself in the nearest fissure, where it becomes more opaque and grumous. The cord then passes upwards to the base of the stigma, along which it is reflected until it reaches the union of the stigma with the styles, at which place it dips into one of them, or rarely both, and proceeds downwards to the placenta, causing a slight discoloration of the adjoining tissue. The boyaux then separate, and proceed in every direction among the ovula, to which they become firmly attached. They contain much granular matter, which has a strong tendency to accumulate towards their termination. Mr. Griffith states that he has observed an oscillatory motion, but no motion of ascent or descent, of the contained granules. The tubes are simple, and one appears to be allotted to each ovulum, to which it remains applied for some time, invariably passing in at the centre of the fissure, and adhering so firmly that they break across rather than separate. Mr. Griffith was unable to demonstrate their termination internally by actual dissection, but in one instance he observed the boyau to terminate about the fundus of the fissure in a cul-de-sac, which was crowded with granules. Whatever the function of these granules may be, similar bodies exist in the cellular tissue of the ovula both before and after the application of the tubes, and the majority certainly disappear before the tubes reach the ovula.

“No immediate change appears to be produced in the ovula by the application of the tubes; but some time afterwards the excavation appears to enlarge and extend towards the point of insertion of the tube; and this action is continued until the whole of the granular mass disappears, and the chief part of the ovulum is occupied by the

now empty excavation. No further appreciable change, except in size, takes place for some time, and the rudiments of the coma are even visible before any part of the embryo appears to be formed."

Query concerning the First Section of Mr. Babington's genus Centaurea. By EDWARD NEWMAN.

A FEW days ago I received a note from Mr. Roby, of Great Malvern, from which I extract the following passage: "In a botanical excursion a few evenings ago, two specimens of a *Centaurea* were gathered, which, on a cursory examination, I supposed to be *C. nigra*, β . *radiata*: on further examination, however, they proved to be *C. Jacea*, *Linn.*; I could not be mistaken, from its having much narrower and sharper leaves than *C. nigra*, viz., linear-lanceolate, lower ones broader and toothed. In Watson's 'New Botanist's Guide' there is a ? attached to the name in his list of species, indicating that it is very questionable whether or not this plant has really been found in the places alluded to. My specimens are undoubtedly wild."

At my request Mr. Roby kindly forwarded the specimens for examination, and I immediately saw that it was identical with the plant I have several times recorded as being abundant in Herefordshire, and which I have found to agree with Mr. Babington's *C. nigrescens* (*Bab. Man. Ed. 2, p. 181*). I forwarded the specimen to Mr. Watson, who pronounces it the *C. nigra*, β . *radiata* of Babington's Manual: from this decision it were useless for me to appeal. However, I gave Mr. Babington's descriptions a very careful examination, and compared them with the plant, and the result is, that I think Mr. Roby is right in referring his plant to *C. Jacea* of Babington; that Mr. Watson is equally right in referring it to *C. nigra*, β . *radiata* of Babington; and that I also am right in referring it to *C. nigrescens* of Babington.

The queries I would propose are these:—

1st.—How many British species are comprised under the following names?

1. *C. Jacea*
2. *C. nigra*
3. *C. nigra*, β . *radiata*
4. *C. nigrescens*

2nd.—Are not the first, third and fourth absolutely identical?

3rd. — Is not the plant comprised under 3 and 4 the only British representative of *C. Jacea* of Linnæus? Does any other British plant exist as *C. Jacea* in our herbaria?

4th. — Is the plant comprised under 3 and 4 the *C. nigrescens* of Willdenow?

5th. — Is it a species, or a variety of *C. nigra*?

I am little inclined to multiply species, but I think the outer row of florets in one plant being invariably simple and fertile, and in another invariably barren and radiated, is a character so obvious as to induce one to suppose the two specifically distinct: there is *no* similarity in facial appearance as they grow side by side in the meadows and hedges around Leominster.

I shall feel greatly obliged to any botanist who will answer the proposed questions, or throw any light on so interesting a subject. I have read with great care the characters italicized by Mr. Babington as important, viz., *pappus 0*; *pappus almost wanting*; *pappus very short tufted*: also the descriptions of the involucreal appendages. The result of a perusal of these characters is the conviction that Mr. Babington might find examples of each in flowers growing on the same stem. The difference between the pappus being *wanting*, *almost wanting*, and *very short* strikes me as peculiarly unsatisfactory. The time has arrived for discarding imaginary species, and the duty of doing this is as imperative as the admission of new ones when such are really discovered. The talents described under the respective names of "hair-splitting" and "lumping" are unquestionably yielding their power to the mightier power of Truth.

EDWARD NEWMAN.

Pollen of the Fir.

"ON the afternoon of Friday, the 25th ult., the wooded part of Morayshire exhibited a very strange appearance. A smart breeze suddenly got up from the north-east, and all the fir plantations in its course appeared as if enveloped in smoke, large wreaths of which were seen to issue from them. For a time the woods presented a threatening aspect, and many persons concluded that they had become ignited from the excessive heat. As the wind increased, what appeared as smoke rose high in the air in columns, the larger ones like lengthened, inverted cones, each bearing striking resemblance to

the outline of a waterspout when seen at sea. At one time no fewer than fifty of these columns were seen rising above the various plantations in the district. Suddenly the wind fell into a dead calm, and all disappeared. We had the pleasure of being enveloped in a wreath of this substance, and were agreeably surprised to find ourselves bedaubed from head to foot with the pollen of the fir." — *Aberdeen Paper*.

BOTANICAL SOCIETY OF LONDON.

Friday, 2nd July.—George Cooper, Esq^r, in the Chair.

Dr. Davies, of Brighton, and Mr. T. Moore, of London, were elected members. Various donations to the Library were announced. British plants had been received from Mr. F. Townsend, Mr. T. Twining, Jun., Mr. T. Bentall, and Mr. G. G. Mill. Communications on the Potato-disease were read by Mr. W. Taylor, F.L.S., and Mr. Long.

Friday, 6th August.—John Reynolds, Esq., Treasurer, in the Chair.

Donations to the Library were announced from the Royal Agricultural Society of England and Mr. J. H. Wilson. Foreign plants had been received from M. Sagot and M. Richter, and British plants from Mr. J. Roby, Mr. Sim, Mr. Bladon and Mr. T. Moore. Mr. E. G. Varenne, of Kelvedon, Essex, and Mr. James Ward, of Richmond, Yorkshire, were elected members.

Miss Charlotte Wilkins presented a specimen of *Bulbine planifolia*, discovered by her "in a fir plantation about two miles distant from Bourne, in July last."

The specimen agrees so well with the description of *Bulbine planifolia* in the 'Flora Italica' of Bertolini, and with the plates there referred to, as to leave no doubt of its being that plant, which is the *Anthericum bicolor* of the 'Flora Atlantica.' On very slender characters it has been made into a distinct genus by Kunth, who describes it under name of *Simethis bicolor*.

The following papers were read:—

"On the Descriptions of some of the *Hieracia* by Mr. Babington in his 'Manual of British Botany,'" by Mr. James Bladon (Phytol. ii. 927).

"Notice of the Discovery of *Allium sphærocephalum*, L., on St. Vincent's Rocks, Bristol," by Mr. H. O. Stephens (Phytol. ii. 929).

"On the Potato-Disease," by Dr. P. B. Ayres.

"On the Potato-Disease," by Mr. W. Taylor, F.L.S.—*G. E. D.*

*Observations on the Descriptions of some of the Hieracia by Mr. Babington in his 'Manual of British Botany.'** By JAMES BLADON, Esq.

BEING much interested in the different species of *Hieracium*, my first employment after receiving the Manual was to examine the different specimens I had with Mr. B.'s descriptions. In some of his descriptions he uses the expression "*glandular hairy*," which, by being put in italics, may be considered as indicating a portion of the specific difference. In some of the other descriptions he uses the word "seta," which, in botanical nomenclature, is understood to mean a stiff bristle *not bearing a gland*. If he means any difference between the above two expressions he has not been happy in the use of them, as he describes *H. murorum* "with white stellate pubescence and many black setæ." In the specimens from Dursley (by Mr. Stephens), distributed by the Society, the involucreal scales and peduncles are with black glandular hairs, *not black setæ*. In the specimens I have examined in this neighbourhood (amounting to some hundreds) they are much more densely glandular-hairy, and less pubescent than the Dursley plant, and without any common bristles or hairs (setæ) being interspersed among the gland-bearing ones. With regard to his separating *murorum* from *maculatum* and *sylvaticum* as a species distinct from either, I believe him to be correct. I have observed them several seasons growing on the same bank, within a few inches of each other in some instances, yet out of numbers there was not one but might be distinguished at the first glance: the flowers of *murorum*, although generally a much smaller plant, are considerably larger than any of *maculatum*.

The absolute necessity of examining the species of *Hieracium* during the whole period of their growth, is instanced by his description of *sylvaticum* and *maculatum*, which he has united under *vulgatum*, *Fries*. He has inserted them in the section "Radical leaves present at the time of flowering." I yesterday examined a great number of plants of *maculatum* in a growing state, and found not one without

* Read before the Botanical Society of London, 6th August, 1847.

its radical leaves being entirely shrivelled up and decayed. By his statement of "Barren radical leafy tufts contemporaneous with the flowers," I believe I can suggest how he has committed the error. In my remarks upon *maculatum* sent to the Society, September, 1846 (*Phytol.* ii. 686), I alluded to a second growth of flowers, in the same season, from the same roots: when the first shoots have nearly developed all their flowers, or about the beginning of August, fresh buds are sent up from the roots, which throw out a tuft of radical leaves (if the summer is showery they are two or three weeks forwarder), but they are not "barren," but bear flowers from September until killed by the frosts in December. A stranger to the varied habit of the plant, when shown a vigorous stem gathered in the middle of July, and another in November, would with great difficulty be induced to believe that they had sprung from the same root.

There may sometimes be gathered about the latter end of May a few small specimens of *maculatum*, about the size of the dwarf autumnal plants mentioned above, with from four to six or eight flowers and buds on each, and if gathered when the first flowers open, they may then be procured with the radical leaves not all decayed.

In his description of the pubescence of *vulgatum* and its varieties he makes no mention of glandular hairs being intermixed with the bristles on the upper part of the peduncles and the involucreal scales: in some plants they are very copiously intermingled.

As if to show the deceptive character of many of the usual distinctions of plants when applied to this protean genus, I have now before me the panicle of one plant, which in one head has the seeds of a bright chestnut colour, and in another head they are a deep, sooty black, in others, again, of a light chocolate colour. Under *boreale* Mr. B. alludes to the colour of the seed.

Hypochaeris radicata.—I gathered several plants lately of this species, and found the back of the teeth of the corolla bearing glands: there were about three on each floret. In 'English Flora,' iii. 351, *Apargia hispida* is stated to bear glands at the back of the teeth of the corolla.

Dactylis glomerata.—Among plants subject to white varieties may be enumerated the above. While out botanizing a few days since, I met with a quantity of the foregoing plant in the damp corner of a field: the anthers, instead of being of the usual deep violet colour, were a cream-coloured white, the stem and leaves were of a very pale green. There were some plants of the usual colour growing

near them, showing by the contrast the extent of their departure from the normal colour.

JAMES BLADON.

Pontypool, June 29, 1847.

*Notice of the Discovery of Allium sphærocephalum, L., on St. Vincent's Rocks, Bristol.** By H. O. STEPHENS, Esq.

I HAVE pleasure on forwarding you for exhibition at the next meeting of the Botanical Society specimens of *Allium sphærocephalum*, L., previously considered to be a native of Jersey and not of England. The enclosed specimens, which appear to be identical with the Jersey plant, I gathered on St. Vincent's Rocks. It is not a little remarkable that *A. sphærocephalum*, a sea-shore plant in the Channel Islands, occurs here on the steep declivities of the cliffs, whilst *A. oleraceum* appears plentifully in the salt soil of the banks of the Avon, below the Rocks, where I have not found a single plant of *A. sphærocephalum*.

H. O. STEPHENS.

6, Dighton Street, Bristol,
July 31, 1847.

Note on the Present Appearance of the Potato Crops around Bristol.
By H. O. STEPHENS, Esq.

I HAVE carefully and anxiously watched the potatoes this season in order to notice, not only the precise day and hour of the attack of disease (if it unfortunately again appears), but also the atmospheric conditions which may accompany it.

Up to this date, August 10th, the crop is certainly generally sound, and of unusual promise, not only as to quantity, but in quality. True it is, that abundant rumours of disease were afloat a few weeks since, and several samples were sent me for examination. There was something wrong in these samples: the foliage was curled, yellow, and flaccid, and like the haulm of nearly ripe plants. The tu-

* Read before the Botanical Society of London, 6th August, 1847.

bers presented brownish yellow spottings, and cracked through the epidermis into deep fissures, an appearance very different to the disease of 1845 and 6. Possibly this might have been the effect of the hot and dry weather. There was no spotting or the slightest traces of the *Botrytis infestans* on the leaves.

At the recommendation of an Aphidean, the haulm of these plants had been copiously dusted with lime, in order to destroy a non-existent source of evil.

The conditions of these plants certainly were unlike those diseased with the murrain of 1845 and 6.

In the last week of July, intelligence of such a pointed nature reached me from a friend, that the potato-disease *of last year* had suddenly shown itself in the parish in which he resided, that I could not doubt the fact of the identity. I visited this parish, Newton St. Loe, near Bath, and found the statement of my friend but too correct. If I had been led into the field blindfolded, I could have sworn to the presence of the murrain by the peculiar stench emitted from the foliage. The disease occupied only a portion of the field, and this affected spot contained within its bounds patches of plants variously affected in intensity of disease, from a scattered spotting of the leaves, to complete rottenness of the whole haulm. The worst spots or patches of disease were in isolated portions, scattered throughout the comparatively healthy parts of the crop.

The foliage of these plants was spotted with the blackened sphacelations of the old murrain, and invariably presented abundance of the *Botrytis infestans*.

I have invariably found this fungus on the leaves and stalks of diseased potatoes, and should, if guided by my own observations *alone*, consider its presence as diagnostic of the malady. I presume our Editor will admit that the disease of 1845 and 6 has re-appeared in this locality in 1847. I trust and believe, however, not in its epidemic, or rather epiphytic form, but as a local or sporadic occurrence.

Potatoes are at present abundant in our market, large, fully developed, and full of starch, very different in appearance and quality from the watery tubers of last year. I trust the late crop will prove as good and abundant as the early: up to this time there is every prospect of it. If the potato-murrain does not become general upon the great fall of temperature we have just suffered, I think there is every probability this may be the case.

Notice of Occurrence of Epimedium alpinum, many years ago, in Leigh Woods, near Bristol. By HENRY OXLEY STEPHENS, Esq.

I WISH to put on record as a hint to other botanists, that many years ago I gathered *Epimedium alpinum* in Leigh Woods. Soon after this I left Bristol, in order to complete my medical education, and my botanical researches being interrupted for a considerable period of time, the exact spot on which I gathered this interesting plant has totally passed from my memory. It was in Mr. Miles's portion of the Wood, but I have searched in vain for it since. A specimen gathered by myself, and marked at the time, is still extant in the herbarium of Dr. Rogers, of this city.

HENRY OXLEY STEPHENS.

6, Dighton Street, Bristol,
August 10th, 1847.

SURREY NATURAL HISTORY SOCIETY.

THE first Anniversary of this Society was held in the Museum Public Hall, Guildford, on Monday, 19th July, at 12 o'clock. There was a large attendance of members and visitors, among whom were Hewett Cottrell Watson, Esq., member of the Botanical Society of London, and G. E. Dennes, Esq., Secretary of the same Society. R. A. C. Austen, Esq., F.G.S., took the Chair, and opened the proceedings with some well-timed remarks, and alluded to the fact that a better day could not have been chosen, it being the birth-day of Gilbert White, of Selborne. Mr. Irvine, one of the Secretaries, read the report of the proceedings of the Council and of the progress the Society had made since its formation. The report was unanimously adopted, with thanks to the joint Secretaries, Messrs. Irvine and Medlock, for their attention to the interest of the Society. From the Treasurer's report it appeared that there are 105 members, and the Society is in a flourishing state. The various officers having been re-elected, and the name of Henry Lawes Long, Esq., of Hampton Lodge, added to the list of Vice Presidents; the Chairman delivered a very interesting statement, in which he alluded to the growing wants of such Societies, the pleasure he had in presiding, and in witnessing the flourishing state of the Society. He then alluded to the

valuable gift of books which had been made, and the many interesting plants which had been discovered by the members of the Society. A vote of thanks was passed to the Chairman, who acknowledged the compliment. A party, accompanied by the Chairman, then went on a geological and botanizing excursion, amongst whom were Messrs. Watson, Dennes, the Rev. J. C. Cox, Messrs. Bull, Eager, Molyneux, Medlock, Salmon, other members of the Society. They proceeded along the side of Chantry Downs, through a most interesting country, ascending St. Martha's Hill, and from thence to Chilworth Manor, the seat of the Chairman, at whose hospitable board they were entertained. During the excursion the attention of the party was particularly drawn towards large patches of *Cuscuta Trifolii*, which infested a clover-field, many of the patches occupying a space of several yards in diameter, within which the clover was entirely destroyed by this parasite. *Fedia Auricula* was observed intermixed with *olitoria* and *dentata*. This species had not been noticed as occurring in the neighbourhood previously. On their return to Guildford, shortly after seven o'clock, they rejoined the party at the Museum, and partook of tea and coffee with about sixty other ladies and gentlemen, members of the Society, after which they separated, the whole evidently much gratified with the day's proceedings.

At the monthly meeting of this Society, held at Guildford, on Thursday evening, the 5th inst., specimens of *Pyrola minor* were presented by Master Wood, from Old Thorns Wood, in the parish of Scale, in this county. This interesting addition to the Surrey Flora was first discovered by Miss Marian Wood, during the summer of 1839, and it is owing to the formation of this Society that the fact of its existence in this county was brought to notice. Mr. Salmon visited the locality, and found the plant in great abundance growing under the underwood.

J. D. SALMON.

Godalming, August 11th, 1847.

Notice of the 'London Journal of Botany,' Nos. 65 to 68, dated May to August, 1847.

No. 65. Contents: Continuation of "Mr. Geyer's Rocky Mountain Plants;" by Sir W. J. Hooker. "Botanical Information;" including a notice of *Malva verticillata* (Linn.) having been "detected in a corn-field in Wales, by James Motley, Esq." A notice of Watson's "Cybele Britannica." A notice relating to the "Herbarium of the late M. le Colonel Bory de St. Vincent;" and "Figure and brief Description of a new *Lisianthus* from New Grenada." "Floræ Tasmaniae Spicilegium; or Contributions towards a Flora of Van Diemen's Land," by J. D. Hooker, M.D., &c.

No. 66. Contents: "Floræ Tasmaniae Spicilegium," &c., continued. "Description of a new species of *Lysipoma*, from the Andes of Columbia;" by J. D. Hooker, M.D., &c. "Notes on *Sphærocarpus terrestris*, Mich.;" by George Fitt, Esq. "Brief Characters of some new Mosses, collected in New Grenada by Mr. W. Purdie;" by W. Wilson, Esq. "Figure and Description of a new *Cardamine* from New Grenada;" by Sir W. J. Hooker. "Sur la nouvelle famille des *Cochlospermees*;" by J. E. Planchon, Docteur es Sciences. "Decades of Fungi;" by the Rev. M. J. Berkeley, M.A., &c. "Botanical Information;" including a notice of "Mc Ivor's *Hepaticæ Britannicæ*." "Descriptions of new *Musci* and *Hepaticæ*, collected by Professor William Jameson on Pichincha, near Quito;" by Thomas Taylor, M.D.

No. 67. Contents: Continuation of Dr. Taylor's "Descriptions of new *Musci* and *Hepaticæ*." "Some Observations on Dr. Leichardt's Overland Journey from Moreton Bay, on the east coast of Australia, to Port Essington, on the north coast;" by R. Heward, Esq. "On Sir T. L. Mitchell's Discoveries in the interior of New South Wales;" by R. Heward. "Short Description of a new genus of Plants, belonging to the order *Proteaceæ*, from South Africa;" by W. H. Harvey, Esq. "Notes on *Algæ* observed at different altitudes in Aberdeenshire;" by G. Dickie, M.D., &c. "Supplementary Notes on the Botany of the Azores;" by H. C. Watson, Esq.

No. 68. Contents: Continuation of Mr. Watson's "Supplementary Notes on the Botany of the Azores." "*Algæ Tasmanicæ*, being a Catalogue of the Species of *Algæ* collected on the shores of Tasmania by Ronald Gunn, Esq." &c.; by J. D. Hooker, M.D., and W. H. Harvey. "Contributions towards a Flora of Brazil, being the

Characters of several new species of *Compositæ*;" by George Gardner, Esq.

Among the above enumerated papers, that which records the discovery of the *Malva verticillata* in Wales, may be supposed of most interest to British botanists generally. From the "information" given in the Journal, it appears that the *Malva* in question was discovered in a corn-field at Llanelly, in Glamorganshire, by Mr. James Motley, in 1845; only very few specimens being found. Mr. Borrer has raised the plant in his garden, from the "wild" seed; and he communicated examples of the wild and garden states to Sir W. J. Hooker. Both these distinguished botanists have thus had before them the necessary data for determining the species; and as some degree of uncertainty nevertheless still remains, we shall make a few extracts from their remarks and descriptions.

"Mr. Borrer had the kindness to communicate to me," writes Sir William, "a small wild specimen from the field at Llanelly, and one about twice the size, raised from wild seed, and of which about the upper three-fourths of the plant is here represented. The most remarkable characteristic of the species is the absence of margin (or angle to the margins) to the carpels, so that there are deep grooves or channels, as it were, between them, and they only seem to touch or unite at the axis of the entire fruit. There is, further, a slightly elevated dorsal line on each carpel, and lines radiating at the sides from the axis and extending to the rounded margins. In my own rich herbarium I could not at first detect the species, and was on the point of publishing it as new, when, on examining carefully the fruit of *Malva verticillata* in the Linnean herbarium, I did not hesitate to refer Mr. Motley's plant to it. The Linnean sample seems to be a cultivated one, and China is the country given as the habitat. Native wild specimens I have not seen; but I possess the same species from the Botanic Garden at Glasgow; and the '*Malva microcarpa*' of Montbret, from Egypt, does not appear different. The *M. verticillata* of Turezani now, from Dahuria, in my herbarium, has no perfect fruit; *Bernhardi* has constituted of that a new *M. pulchella*. I am happy to have my view of the identity of this plant with the Linnean *M. verticillata* confirmed by so careful an observer as Mr. Borrer, who writes thus," &c.

"Although," adds Sir William, "the discovery of this mallow in Wales has thus been, I trust, the means of enabling us in future better to distinguish the species, I fear we must not venture to consider it a native of Great Britain. It is not described even as naturalized

anywhere in Europe. 'Is it not odd, however,' Mr. Borrer further remarks, 'that *Malva crispa* should ever have been thought a variety of this? It is rather remarkable that Mr. Motley has seen the *M. crispa* in the same field, but concluded that it was from its being kept in gardens for garnishing dishes at table. Is it possible that after all they are but varieties? I do not recollect the fruit of *M. crispa*.' In regard to *M. crispa*," (resumes Sir William) "though it is said to be a native of Syria, I possess only a cultivated specimen in my herbarium from our English gardens; and the fruit of that, though nearly resembling that of *M. verticillata*, is yet different. The margin of the carpels is not rounded off, but comes to an angle, so as not to present a distinct furrow between the carpels; and the radiating lines from the sides do not become obsolete at the margins, but extend across the back to the dorsal line: such is the case with the excellent figure in Reichenbach's 'Icones Fl. Germ. et Helv. Malvaceæ, Tab. 166, n. 4834.'"

It would seem from our quotations, that Sir W. Hooker refers the Welsh plant to the Linnean *Malva verticillata* chiefly, if not solely, on account of the similarity of its fruit. Mr. Borrer recognizes this point of resemblance, but gives his opinion for their identity more guardedly on account of certain differences in the form and disposition of the leaves, between the Welsh and Linnean specimens. Both these botanists apparently entertain some suspicion that the Welsh plant may be a form of *Malva crispa*; and the fact of Mr. Motley finding both of them in the same field, must be allowed to weigh something on the side of this view. The *Malva crispa* is probably a garden variety, like the curled parsley or crisp mint; and it seems not beyond probability that the Welsh examples may be those of the same species in its more natural condition. We have not seen any of the Welsh specimens; but the figure of the "single carpel," given in the Journal, is truly very like the carpels of *M. crispa*; and if we make the necessary allowance for the want of curled leaves, the figure of the plant itself might pass for one of *M. crispa*. In our dried example of the latter (a road-side specimen, probably from some garden) the carpels are not so much rounded on the back as the figure of the undivided fruit expresses, and some of the radiating lines from the sides of each carpel do extend across the back, as Sir William Hooker intimates. It is to be hoped that some of our country botanists will raise the *M. crispa* from seed, and ascertain whether any of the progeny may sport (revert?) into something more like *M. verticillata*. We transcribe the description, marking by italics

those three characters which render it less applicable to a specimen of *M. crispa*, we can scarcely say, quite inapplicable; for the differences are those of degree more than those of kind, comparative rather than absolute.

Malva verticillata, L.—“Annuæ erecta, foliis longè petiolatis cordatis subprofunde 5-angulatis angulis lobisve obtusis crenato-serratis, floribus axillaribus fasciculatis brevè-petiolatis vel subsessilibus, petalis calycem (demum fructus omnino tegentem) paulo superantibus, carpellis 10-12 in orbem *totidem-lobatum* dispositis orbiculari-reniformibus glabris *dorso uninerviis* marginibus rotundatis lateribus altere radiatim venosis *venis dorso* (nisi ad margines) *obsoletis*.”

Mr. Fitt recorded his discovery of *Sphærocarpus terrestris* “abundantly in fructification near Yarmouth,” at page 544 of our present volume of the ‘Phytologist.’ In the ‘London Journal’ he gives figures and a more extended description of the plants observed by himself, “on clover layers at Bradwell, Suffolk. In the mild moist January of 1846 the plant was very abundant, producing its capsules in plenty from about the middle of February to the middle of March: in the early part of April it had disappeared entirely.”

Dr. Dickie’s notes on the Algæ have reference to the altitudes at which he has observed certain species in Aberdeenshire; together with some prefatory remarks on their motions, divisions and conjugation. Perhaps a paragraph or two from the latter may have interest for some readers of the ‘Phytologist.’

“The motions of certain species of *Oscillatoria* are at least equally distinct as those of any organisms usually considered to belong to the vegetable kingdom, and yet it has been denied that they possess any independent power of motion. They move notwithstanding. Three kinds of motion may be observed in them; first, the oscillating, one end of the filament being fixed, the other describing a segment of a circle with greater or less rapidity; second, a distinct bending of the filament upon itself, presenting the appearance of a writhing motion; third, the progressive gliding motion of an entire filament or of a fragment, resembling that of certain Mollusca or Planariæ.

“Mr. P. Grant has directed my attention to a remarkable motion which may be observed in newly collected specimens of *Hæmatococcus binalis*. This beautiful species propagates freely by self-division; and the cells vary in number in different individuals, in some two and four, in others eight, and more rarely sixteen. The phenomenon in question is that of rotation of the cells in the interior of the

mucoous matter which surrounds them. Leuwenhoeck observed long ago that, in the ova of certain Mollusca, the yolk revolves in the surrounding fluid at a certain stage. If there be no mistake about the phenomenon alluded to in *Hæmatococcus*, and I cannot detect any source of deception, and if to it we add the mode of subdivision of the cells, we have a remarkable analogy between the ovum of certain animals, and an organism decidedly vegetable, and of very simple structure. In the ovum of the animal it is well known that the motion is produced by ciliæ, which make their appearance at an advanced stage; what may be the true cause in the plant I am unable at present to say. The motion in the *Hæmatococcus* is very slow compared with that in the ova in question."

As the other papers relate to the plants of distant lands, they are foreign to the avowed objects of the 'Phytologist.' The "Supplementary Notes on the Botany of the Azores" may be a partial exception; the affinities between the Azoric and Britannic Floras being close, and constituting important facts in any attempts to account for the present distribution of plants on the surface of the earth. Some brief remarks on these affinities were made in the 'Phytologist' for last year (Phytol. ii. 463). In the article before us, Mr. Watson adds a list of forty-eight species, received by him from the Azore Islands, since the publication of his former papers on the same subject. Thirty of these added species are clearly indigenous in the British Islands, and four of the others are more or less established with us; the remaining fourteen species, with one exception, being recorded natives of South Europe or Madeira. On looking over the list of names, however, there can be no hesitation in ascribing much of the specific affinity between the two insular Floras to the operations of mankind, rather than to any more natural agency; many of the species being those agricultural or road-side weeds which emigrate widely with mankind, as *Lamium amplexicaule* and *Capsella Bursa-pastoris*. But there are others in the list which appear to be among those least likely to have been so conveyed, as *Hypericum Elodes* and *Myriophyllum alterniflorum*.

It is a circumstance worthy of note, while alluding to similarities in the botany of the different countries, that several of the Azoric representatives of British or European species are stated to present certain slight differences, sufficient to separate them as varieties, and yet not sufficient to establish them as genuine species; and, moreover, that in some instances these differences have been transmitted

from generation to generation of plants raised in England originally from the Azoric stock.

Ten years ago, it might have been said that almost nothing was known about the botany of the Azore Islands. At the present time, however, it is probable that the published lists of Azoric species are more complete than those of Madeira plants; and are not much, if at all, behind those of the Canary plants. Nor is it only in published lists of the species that this rapid progress has been made in the last few years. Our resident Consul, Thomas Carew Hunt, Esq., has enabled the Botanical Society to distribute numerous specimens, particularly of the more characteristic species; and has thus rendered them familiar to the eyes of many botanists, who might otherwise never have seen samples of Azoric botany. It seems that Mr. Hunt is a member of the Botanical Society of London, and doubtless a very useful one; for we find Mr. Watson thus writing of his contributions:—

“All the species enumerated in the subjoined supplementary list, excepting *Viola tricolor* and *Lolium perenne*, which were sent from Flores by Dr. Mackay, have been communicated to the Botanical Society of London or to myself, from the islands of St. Mary (very few) and St. Michael, by Mr. Hunt, together with an ample supply of duplicates of most of the rarer species of the Azores, for distribution to the members and correspondents of that active and useful Society. I may be allowed to observe here, while referring to Mr. Hunt's valuable exertions towards completing our knowledge of Azoric botany, that in sending his collected specimens to the London Society, he has taken the course which best insured their *immediate* distribution into numerous herbaria in England, Europe and America.”

C.

On the Claims of Linaria supina to a place in the British Flora.

By ISAIAH W. N. KEYS, Esq.

MR. BABINGTON has, in the second edition of his *Manual*, introduced *Linaria supina* as “*a true native*” at Plymouth. This he has done as upon my authority; but Mr. B. has fallen into an error, which I exceedingly regret. I have communicated with him upon the subject, and he has requested me to say, in any publicity which I might

give to the inadvertence into which he has fallen, that he no less regrets the circumstance than myself.

Your readers would perhaps feel an interest in the history of this plant, which will enable them to judge of its claims to be in any way inserted among the British Flora.

In the summer of 1845 I noticed on some *ballast-heaps*, composed of *chalk and flint*, deposited on the outskirts of the limestone quarries at Catdown, Plymouth, a *Linaria* (which had, I believe, been previously observed, but passed unregarded) a description of which I could not find. In consequence of this, I sent a specimen to Mr. Babington, and subsequently a second, he not being able to determine the species by the first, owing to the absence of seeds. I furnished him with all particulars as to the place where I had found the plant, and the soil in which it was growing, suggesting for his consideration the probability of its having been brought to Plymouth with ballast. On the 15th October he wrote me as follows: "*Linaria* from Catdown quarries. — After a very careful examination of this, I have come to the conclusion that it is a form of the *L. supina*, called *L. maritima* formerly by De Candolle. It is a native of the south and west of France, and therefore *may* be a native with you. I hope that you or some of your friends will look carefully into the question, and endeavour to determine with certainty if it came with ballast or not. Where does the ballast come from?"

Not having been able to procure any information at all satisfactory, here my correspondence with Mr. Babington relative to this *Linaria* dropped, and was not revived until I saw the plant in the 2nd edition of the 'Manual of British Botany.' I was startled to see the words "a true native," and my name attached, because my opinion always was that the plant came into the quarries by accident. I immediately wrote to Mr. Babington, expressing my surprise and vexation, when he replied (26th July, 1847), "I certainly never felt more sure of anything than that you considered the *Linaria supina* a NATIVE plant, not one introduced with ballast. As the latter, it must be expunged from our lists. My belief is that the words were quoted from a letter from you (I cannot find it now) in answer to one from me, asking if the plant was really a native or not." The letter of inquiry to which Mr. Babington here alludes, must be that of the 15th October, 1845, to which, as already stated, *I never replied*. He has therefore laboured under a misconception; I acquit him of all design to propagate error; and before this appears in print, he will have employed the press to correct the mistake.

If it were not encumbering your pages, I would state my opinion that the plant is naturalized at this place. The heaps of rubble on which it grows have not been disturbed for years, and until they be cleared away, the plant will in all likelihood remain and spread itself. It is now to be found more scattered than it was three years ago.

ISAIAH W. N. KEYS.

Plymouth, August 5, 1847.

The Castanha Tree.

"BACK of the house was a grove of fine trees, some apparently having been planted for ornament, others bearing profusion of various sorts of fruits. The one of all these most attractive was that which produces the Brazil-nut, called in the country castanhas. Botanically it is the *Bertholletia excelsa*. This tree was upwards of one hundred feet in height and between two and three in diameter. From the branches were depending the fruits, large as cocoa-nuts. The shell of these is nearly half an inch in thickness, and contains the triangular nuts so nicely packed that once removed no skill can replace them. It is no easy matter to break this tough covering, requiring some instrument and the exercise of considerable strength: yet we were assured by an intelligent friend at the Barra of the Rio Negro that the Guaribas or howling monkeys are in the habit of breaking them by striking them upon stones or the limbs of iron-like trees. This friend related an amusing incident of which he had been witness, where the monkey, forgetful of everything else, pounding down the nut with might and main, in a fever of excitement struck it with tremendous force upon the tip of his tail. Down dropped the nut and away flew monkey, bounding and howling fearfully. How long the victim was laid up by his lame tail our friend was unable to inform us; but we thought one thing certain, that monkeys had changed since Goldsmith's day, inasmuch as at that time, as we are informed, the tip of a monkey's tail was so remote from the centre of circulation as to be destitute of feeling. When the castanha-nuts are fresh they much resemble in taste the cocoa-nut, and the white milk, easily expressed, is no bad substitute for milk in coffee. This soon becomes rancid, and at length turns to oil. The nuts are exported largely from Pará, and are said to form a very important ingredient in the manufacture of sperm candles."—*A Voyage up the Amazon*.

On the Gelatinous Materials of Plants.

Académie des Sciences, June 14, 1847. — “M. Frémy presented a memoir upon a question which has occasioned much controversy among chemists, namely, the nature of the gelatinous materials of plants. He especially endeavours to show that it is no longer possible to confound pectine with the gums, mucilage, and above all, with pectic acid, which is soluble in water. He describes many isomerical substances, and gives to each a new name. He distinguishes by the appellation of *pectose* a substance which, like cellulose, is insoluble in water, alcohol and ether, and by the action of the weaker acids is converted into *pectine*. It is chiefly found in the tissue of vegetables, together with cellulose. According to M. Frémy pectose occurs in the generality of fruits and roots; and like diastose, it is capable of forming, with the gelatinous substances of plants, a series of isomerical metamorphoses. When a mixture of pectose and pectine is inclosed in a flask and hermetically sealed, the pectine is seen to be successively changed into pectosic, pectic, parapectic and metapectic acids, without forming any secondary product. All substances composed of carbon differ in composition solely in the elements of water which they contain. The author draws from his researches this important physiological conclusion, that fruits, in their progress towards maturity, pass through different intermediate stages: — that pectose predominates in green fruits; that in proportion as maturity is attained, the pectose is changed into pectine; and that in fully ripe fruits, the pectine is in its turn converted into metapectic acid.”—*Nouvelle Revue Encyclopédique, Juin, 1847.*

Occurrence of Juncus diffusus on Epping Forest.

By EDWARD FORSTER, Esq.

JUNCUS diffusus, Hoppe, is to be found on Epping Forest, between Walthamstow and Woodford, not far east of the seven-mile-stone, on the New Road, and also in a wood hard by, called Great Shrubbush, in the parish of Wanstead, growing intermixed with two or three varieties of *Juncus glaucus*, the most green of which approaches it in appearance, but may be easily distinguished by a proper attention to the distinctive characters pointed out in the last edition of Babington's Manual; to which may be added, *Juncus diffusus* is a much more

solid, and therefore harder rush, and also that the fruit of this species is considerably smaller than that of *Juncus glaucus*.

The difference of the two species becomes more conspicuous as the season advances; the spikes of *Juncus diffusus* fall in decay, while those of *Juncus glaucus*, with the larger fruit, remain strong and upright.

EDWARD FORSTER.

Woodford, 20th August, 1847.

Account of a Botanical Excursion to Whitsand Bay.

By FRANS. P. PASCOE, Esq.

WHITSAND Bay is a short distance to the north-west of the Rame Head, and about three or four miles from Plymouth. It must be carefully distinguished from another bay of the same name, near the Land's End, as ignorance of this has led to very vexatious mistakes.

I left home on the 4th August, taking the coast-road through Fowey and Looe. Crossing Par Sands, midway between St. Austell and the former place, *Glaucium luteum*, in great abundance, is very conspicuous, but the rarest plant here to any other than a Cornish botanist is *Polygonum Raii*, which is scattered plentifully over the beach, in company with *Salsola Kali* and *Cakile maritima*. The caverns in the low cliffs abound in *Asplenium marinum*, and along its base are a few plants of *Rumex Hydrolapathum*. Another plant which grows here, but was not now in flower, is *Raphanus maritimus*, the finest specimens, however, are found in the Lizard district, where it is very common. Ascending the hill from Par, *Sison Amomum* occurs in the hedges; and at Bodinnick, where the ferry for carriages across Fowey river is established, *Hypericum maculatum* grows by the road-side; in the spring *Allium ursinum*, a rare plant in Cornwall, abounds here and in the neighbouring hedges. Bodinnick is a small village adjoining Fowey; in both places *Centranthus ruber* adorns some of the old walls.

As my principal object in this excursion was to obtain *Euphorbia Peplis*, I hastened on through Looe, intending first to examine Seaton Sands, which I had somehow got the notion was a locality for this plant, and the next day to proceed to Whitsand Bay. On my arrival at Seaton, however, the rain, which had now continued some time, having completely drenched me, and finding no accommodation

there, I drove off to Hessenford, distant $2\frac{1}{2}$ miles, where I passed the night. Hessenford is beautifully situated in a well wooded valley, with cottages surrounded by orchards, its mill-stream and church. *Hieracium umbellatum* is common in this part of the county, and from the new road to Seaton I observed by the river side *Tussilago Petasites*, with leaves nearly two feet across.

Nine o'clock the next morning saw me on Seaton Sands. I probably spent more than hour here, searching the shore and adjacent ground for the *Euphorbia*. The sands are of no great extent; fishing-nets were drying on one part, and sea-weed for manure, in large heaps, was rotting in another; so that setting aside the rapacity of botanists, if the poor *Euphorbia* grow here, it is not very likely to escape destruction at no very distant day. A group of *Atriplex rosea*, all female plants, and of the deepest purple, covered a piece of ground where a heap of sea-weed had stood. *Polygonum Raii* was mixed with *P. aviculare*: I do not recollect ever having seen them in company before.

My course was now directed along the beach, but the rocky shores in many places projecting into the sea, and finding nothing more remarkable than *Carex distans* and *Atriplex laciniata*, I struck up across the country towards Craithole. Here I again diverged towards the coast, and in a short time, amid thickets abounding in *Rubia peregrina*, descended the cliff, by a narrow pathway, at Whitsand Bay.

Whitsand Bay, or White-sand Bay, for it is spelled either way, is certainly something of a misnomer; a few yards of brown sand along the base of the cliffs is all to distinguish it from the rocky coast with which it is continuous; it is, however, a spot of great interest to the botanist. In addition to many other rarities, here *Orobanche amethystea* rears its remarkable form, and in Great Britain only here. We are indebted to the Rev. W. S. Hore (*Phytol.* ii. 239) for having brought this plant under the notice of British botanists, although it was discovered many years before by the Rev. C. A. Johns. It is constantly parasitic on *Daucus maritimus*, and flowering in June, but the persistent corollas gave it the appearance of being still in full bloom. A revision of the English, better still of the European species of *Orobanche*, is a desideratum, and to any botanist wishing to undertake it, I shall be happy next season to forward fresh specimens of our rarer Cornish ones, viz., *O. rubra*, *amethystea* and *Hederæ*. *Inula Crithmoides* was just coming into flower, *Statice spathulata* and *Euphorbia Portlandica* were, on the other hand, going out, nevertheless I gathered excellent specimens of the three. Jones, in his

Tour, gives "shore near Craffhole" as a station for *Statice Limonium*; *S. spathulata*, which *cannot* be overlooked, and is not otherwise mentioned, was probably intended by him; *Trifolium suffocatum*, having the same station, seems to have escaped later researches. More recently, however, Mr. Hore has added *Vicia lutea*; being too late in the season I did not see it. *Daucus maritimus* and *Crithmum maritimum*, the latter very fine and in dense beds, abounded here, as they do on nearly all our rocky shores. On one part of the cliff I think I recognized *Squamaria lentigera*, but it was out of reach; it is found sparingly at Newquay, on the north coast.

The sun had been early obscured by clouds, and a disagreeable drizzle succeeded, which about noon rapidly increased to heavy rain. I had now nearly arrived at the eastern end of the Bay, and was preparing for the weather and my return, when at my foot, and surrounded by *bushes* of *Cakile maritima*, was the anxiously sought *Euphorbia Peplis*! There was but one plant, nor did I, after another fruitless search, commit it to my vasculum without a pang that I might perhaps have taken the last of its race on the Cornish shores. In 1830 Mr. H. C. Watson* found it very sparingly on the sands between Penzance and Marazion, a locality where it was very plentiful in the time of Ray. I believe it has not been found there since. The localities given in Somerset, Dorset and Cardigan shires require modern confirmation; it may probably be still found in Devonshire. It is an interesting plant, belonging to a southern race, but once plentiful in the west of England. I shall be glad to see the pages of the 'Phytologist' recording what is known of its present localities.

My ride home from Hassenford through Liskeard and Lostwithiel was without any interest beyond what the heavy and continued rain afforded. In the hedges near the former town *Cornus sanguinea*, *Melittis Melissophyllum* and *Viburnum Opulus*, plants common only in the eastern part of the county, are to be met with, although not now in flower.

Note.—As I am preparing a Cornish Flora I shall feel deeply indebted for any information, either by lists, specimens, or remarks which your readers may be able to afford me.

FRANS. P. PASCOE.

Trewhiddle, near St. Austell,
21st August, 1847.

* Watson's 'New Botanist's Guide,' p. 11.

Notice of the 'Reports and Papers on Botany,' published by the Ray Society, 1846.

THE last-published volume of these Reports contains analyses of many valuable and interesting papers on various subjects connected with Botany, both foreign and British, which appeared during the years 1842 and 1843. These are arranged under the heads of "Morphology of the Coniferæ, by Dr. J. G. Zuccarini;" "Reports on Botanical Geography, by Prof. Grisebach;" "Memoir on the Nuclei, Formation and Growth of Vegetable Cells, by C. Nägeli;" and "Report on the Progress of Physiological Botany, by Dr. H. F. Link." To some of them we may probably revert at a future period; for the present we content ourselves with a few extracts, which we trust will prove acceptable to such of our readers as may not have access to the volume itself.

On the Excretion of a Fluid from the Apex of the Leaves of Calla and Canna.—This phenomenon has already been mentioned in our pages by the late Mr. E. J. Quekett (Phytol. i. 218) and Mr. Wilson (*Id.* 612); the following observations from the pen of L. F. Gärtner are interesting.

"After an historical introduction follows an accurate diary of this phenomenon in specimens of *Calla*, which the author had under his eye. He then gives a chemical examination of the distilled fluid, which contains scarcely any solid matter; the residue after evaporation showed principally mucus and hydrochloric acid. Further, with regard to the organization of the leaves, he states, that the vessels are not continued to the end of the awl-shaped prolongation at the apex of the leaf, but that here there is nothing but cellular tissue. The secretion takes place at the extreme end of this prolongation, in a length of 1 to 1.5 m. in a scarcely visible manner, until the fluid has collected into a drop. After the death of the prolongation, the margin of the extreme apex of the leaf itself takes on the same function. The special organ of the exudation of the moisture, seems to be the elongated pores of the cuticle; and the imbibition of the excreted fluid, which is sometimes observed, seems also to be owing to the same. Light has no perceptible influence on the dropping from the leaves. Warmth alone has no special action; though it has when it is combined with immersion in water. The excretion was feeblest in a morning; increased towards noon; was most copious in the afternoon, from 2 to 5 p. m., and declined again during the

night ; but this periodicity is not accurately determined. There can be no doubt that the dropping arises from an excess of fluid beyond that which is requisite for the nourishment of the plant. The dropping ceases with the development of the spathe and organs of reproduction. The necessity of the plant for water was greatest during the night, but especially on the development of the spathe.

"A supplement gives a diary of the watery secretions of the leaves of *Canna angustifolia*, *indica*, and *latifolia*. The secretion of watery fluid takes place in *Canna*, not from the apices of the leaves as in *Calla*, but from the apices of the parallel ribs, which terminate at the margin of the leaf ; and generally more from those which are nearer the apex of the leaf, than from those which are situated nearer to its base. From these terminations of the principal veins of the leaves, close to the margin, where they lose themselves in a delicate network or anastomose (seldom in the middle of the surface of the leaf), towards evening and at night, imperceptibly exudes a clear watery fluid, which collects in drops and patches on the upper and on the under surface of the lamina ; running from it sometimes, but rarely, in a quantity, as copious as from the apex of the *Calla æthiopica*. The temperature of the air stands at least in no near relation to this excretion. It is rather promoted than hindered by the growth of the leaves ; but it is quite the reverse when the plant puts forth stalks and flowers. This secretion then generally ceases for ever."

On the Ramification of Caryophyllæ.—Professor Wydler, of Bern, observes that "the branches [of these plants] are situated, as we know, alternately in the angles of the opposite leaves, the uppermost pair of leaves excepted, where the branches likewise are opposite. The author, however, remarked opposite branches also in *Cerastium arvense*, *Stellaria graminea*, *Spergula nodosa*, but one of them was always more diminutive than the other. Also in the *Caryophyllæ*, the branch connected with the first is always less developed, but that of the second bract (*vorblatt*) is the stronger and more ramified. The author adds that though these may be the external appearances, their intimate nature remains a secret to us, but that it might be possible to discover it if we were to regard the plant, not as a complete, but as a progressive object. All physiologists have done this, and I know of none but descriptive botanists who regard the plant as complete, and are able to view it only in that light. The cause does not lie here, but in that we do not take into view the whole vegetable kingdom, and consider in all its extent the effort of

Nature to advance from the more diffuse vegetable life, to the more collected, concentrated animal life, and thus to consciousness."

"*Examen Organographique des Nectaires, par M. L. Bravais.* — Linnæus designated as nectaries those parts of the flower which secrete a sweet fluid; but he not only included many parts in which no such secretion can be perceived, but also described as nectaries whatsoever was neither calyx, flower, stamen, pistil nor ovary. Science is in want of an expression, says the author, to distinguish a portion of the male apparatus (andræceum) or even a circle of parts, which may or may not secrete a nectareous fluid. Most of the expressions employed do not answer their purpose. In the absence of better the author chooses the terms nectary and disc; the first according to the Linnæan definition, the second in the case where the nectaries form a circle, or ring (Wirtel). Then follow the divisions of the nectaries, according to situations where they occur.

"1. Calyx-nectaries. To this division belong the glands of the calyx in many Malpighiaceæ, some Euphorbiaceæ, the spur on *Impatiens Balsamina*, also the nectary which occurs at the base and within the sepals of the Malvaceæ, as in many kinds of *Malva*, in *Lavatera trimestris*, &c. It forms a whitish and rough swelling (bourrelet).

"2. Hypopetalous nectaries. Only one example is known to the author; externally, and at the base of the flower of *Chironia decussata* is found a yellow, notched ring, which produces honey.

"3. Corolla-nectaries. They occur in most flowers, especially in the lower portions of the petals, in the form of pits, channels, spurs, &c.

"4. Hypostaminal nectaries (Hypostemone Nektarien), between the corolla and the stamens. The author observed them in sixteen natural orders: Capparideæ, Resedaceæ, Hippocastaneæ, Ampelideæ, Geraniaceæ, Oxalidaceæ, Sapindaceæ, Terebinthaceæ, Passifloreæ, where they constitute numerous filaments and cavities secreting honey; Loaseæ (in which I have called them 'Parastaminal'), Cucurbitaceæ, Asclepiadeæ, the corona of which they form (which I have named Paracorolla).

"5. Staminal nectaries. The author describes here many such: e. gr. in a double columbine, in the violet, *Fumaria*, *Corydalis*, *Dianella*, the Laurineæ, *Vinca*, *Phaseolus*, *Alsine media*.

"6. Nectaries inserted between the stamens, as in *Melianthus major* and minor, *Tropæolum*, several Crucifereæ, *Sibbaldia procumbens*.

"7. Discs between the stamens and the ovary (the perigynium of Link). Very frequent; occurring in almost one half of Dicotyledons.

"8. Pistil-nectaries. Rare, in a few Euphorbiaceæ. Linnæus referred to this division the three glands at the apex of the ovary in the hyacinth.

"9. Nectaries on the receptacle. These belong for the most part to the preceding; but with regard to this subject the scales in the flowers of some Crassulaceæ need investigation. There are, however, many flowers which secrete a nectareous fluid, in which, nevertheless, no special nectary can be discovered. The microscopic examination of nectaries shows only cells of various kinds, often filled with sap, but no spiral vessels: they may, however, be seen in *Campanula Rapunculus*, but we cannot be certain here that something has not been cut off from the receptacle. Under the section, 'On the Symmetry of Nectaries,' the author describes their situation in various flowers. He then distinguishes in each leaf of the 'andræceum' four portions, the 'support,' 'nectary,' 'anther,' and 'limb,' and applies this with much ingenuity to individual plants: the greater number of nectaries are parts which want anthers and limb. He applies this also to the pistillary members, where the ovary is compared with the support, the style with the nectary, and the stigma with the anther. He also considers in the last place the leaves of the stem, in which, according to our author, the base of the petiole, very often thickened, corresponds to the support; the petiole, often covered with glands, to the nectary, and the lamina to the anther. On the use of the secretion of the nectary the author has but little to say; he thinks that in many plants it becomes re-absorbed, and probably serves for the nutrition of the ovule.

"The division into discus and nectary, according as they have a circular arrangement or not, is not much to the purpose, since there are undoubted nectaries which stand in a circle, like the pits on the petals of *Fritillaria imperialis*, *L.*, and many others. That which the author also calls disc, includes parts so very various that they cannot be well designated by one and the same term. I adhere to the terminology which I formerly adopted, [which is, at least, readily intelligible, where 'Paracorolla,' 'Parapetala,' 'Parastemones,' are readily distinguished as to their position and form. 'Perigynium' expresses all the parts surrounding the pistil, whose variations are readily announced by the use of an adjective: 'Perigynium disciforme' is the great disc which in many flowers surrounds the pistil; the only form for which the word disc is applicable. The word 'glandulæ'

may always remain in use, even when these parts secrete no fluid; first, because it is acknowledged by almost all descriptive botanists, and also, because even anatomists have retained this expression, where no secretion takes place, *e. gr.* 'glandulæ conglobatæ.' The word nectary may always be retained as a general name; but in descriptions it would be better to say *fossæ nectariferæ*, &c.

On the 'Involucra' in Cynosurus and Setaria. Dr. H. Koch observes "that the so-called involucre of *Cynosurus* consists of sterile spikelets, is apparent to the eye, and has been already recognized by many. The so-called setæ of *Setaria* are peduncles, whose flowers have not attained to perfection. The author shows this in detail, and then adverts to the distinctions between *Setaria viridis*, *italica*, and *verticillata*. He states in conclusion that simple alternation is confessedly in the grasses the fundamental arrangement, from the leaves up to the stamens, which are almost always arranged by threes. Our *Setariæ*, he continues, present the interesting fact, that the transition, the fluctuation between the two numerical proportions (the occurrence of twos or of threes), is not confined, as in the other grasses, to the contrast between flowers and leaves, but appears even in the distribution of the branches. Although the endeavour to give predominance to a divergence of one-third is sufficiently well marked, yet it is never completely established; for not only, as frequently occurs, do the primary branches, at the commencement and end of the spike, revert to a divergence of one half; but all the secondary branches up to the last, the peduncle, again exhibit a transition from one-third to one-half, and the latter divergence continues thenceforward, as is usual in double flowers and their parts; so that the *Setariæ* change their order of arrangement twice, whilst other grasses do so for the most part but once.

"In the leaves of most grasses we see indeed the arrangement in threes, for the alternating leaves are in general only a contracted whorl. There is also another circumstance connected with the inflorescence constituted by the peduncles, viz., the antecedence (*Prolepsis*), the earlier or later development, and of this the author has taken no notice. The expression divergence is very unsuitable, and the author himself speaks of the casual magnitude of the angle. Most morphologists interchange the terminology of descriptive with that of morphological botany, which has quite another field. 'Involucre' signifies the arrangement of parts, external and inferior to the floral sphere, either around a single flower, or around several. What is the character of these parts, considered morphologically, has

not always been as yet inquired ; and even where this has been done, it still remains doubtful, and frequently requires accurate anatomical investigation, which cannot be instituted by the descriptive botanist, or one who applies description to the recognition of species. On these principles the expression 'involucrum' for *Setaria* may be readily justified, and the addition 'setosum' likewise, for the fibres themselves are stiff and bristly. What is a seta, is very differently defined by botanists, and the describer can only have regard to the filamentous form, and stiffness of the bristle of an animal. *Cynosurus* has no involucrum, as I have also stated in 'Hort. Bot. Berol.'— 'spiculæ fultæ bracteis pinnatifidis ;' for these parts represent bracts, though they might also be glumes grown together."

New Theory of the Fertilization of Plants.—Dr. Hartig has here presented some valuable observations on a most interesting subject, which has more than once been ably treated on by Mr. Wilson in the pages of the 'Phytologist.' After some remarks on the present state of the doctrines with regard to Fertilization, the author "proceeds in the first section to endogenic impregnation, or to impregnation in the interior of the ovary. In this case, for instance, a pollen-tube, or tube of pollen-grain (Ballschlauch), as the author says, reaches as far as the ovum, penetrates into the foramen of the ovule, grows through the cellular tissue of the nucleus (Befruchtungskegel) to the spot where the germ originates. According to the author, in the Coniferæ the pollen itself enters the micropyle of the naked ovum, attaches itself firmly to the ovule (Befruchtungsei), and sends a short tube into the cellular tissue, in consequence of which a series of remarkable formations commences, the last of which, after an interval of more than a year, in those Coniferæ that are two years in maturing the seeds is the commencing germ, as was previously quoted from the author's 'Lehrbuch,' in the former yearly Report. The penetration of the tube into the ovule has been satisfactorily ascertained in many families ; but it is the object of the author to show, that fertilization does not always take place in this manner. This is followed by the impregnation of the placenta. In a number of plants by no means insignificant, the pollen-tubes can be traced as far as the ovary, sometimes even to its base ; while we seek for them in vain in the foramen of the ovum, as in many *Cenotheræ*. In all plants, continues the author, to which a deeper introduction of the tube is generally peculiar, the tube turns itself in the shortest way to the cellular tissue of the stigma, penetrates the cuticle, the superficial and the cortical cells, to the central bundle of vessels, and runs from thence

parallel with this latter to the end of the style, where it passes from the cellular tissue of the stigma into the conducting fibres of the canal of the style. When the tube does not enter the cellular tissue of the stigma by the shortest course, but runs to a greater extent free on its surface, the penetration of the tube does not take place at all in most cases, as is seen in *Clarkia pulchella*. The author now considers the penetration of the pollen-tubes into the canal of the style, where they follow the conducting fibres. The conducting fibres of the canal of the style correspond, as the author says, in their structure to the absorbent hairs (Saughaaren) of the stigma; in most cases the absorbent hair is nothing more than the most external cell of a series of conducting fibres, which latter is, however, destitute of cuticle. The conducting fibres consist always of two membranes lying one within the other, of a mucous membrane and a tubular membrane. The pollen-tubes, however, often perforate the outer membrane, in parts where an open canal occurs, and reach the interior. Although we can trace the tubes as far as the ovary, but no further, a transmission of the fertilizing matter from the tubes adjoining the placenta, into its cellular tissue, takes place; and it is forwarded to the ovule through the cells or fibres of the funiculus. The author attempts to prove thereby that in plants with many-seeded ovaries, the number of ova presents often a great disproportion to the number of tubes. In *Oenothera longiflora*, for example, the ovary contained about 1000 ova, of which some 250-300 attained complete development. The usual area of a transverse section of 300 tubes is $\cdot 00785$ of a square line; but the canal of the style close above the ovary has only an area of $\cdot 00785$ of a square line, so that even if it contained nothing but tubes, it would comprise only one-fifth of those which are necessary to fructification; but in the lower part of the canal of the style of this plant not so many as 50 tubes can be counted at the most. The pollen-tubes also appear of greater duration when they enter the ovum; but here, namely, in *Oenothera longiflora*, the author has never found a tube in a single ovum. Since the tube is usually of such a size that it could not easily be contained in the pollen-granule from which it arises, the author considers it probable that the fertilizing material of the granules which have not advanced to the formation of tubes, being absorbed from the surface of the stigma and introduced into the cellular tissue, is taken up by the tubes, and conveyed in common with their proper contents to the spot where impregnation is effected.

“ In the second chapter, epigynous impregnation is treated of, un-

der which the author includes those cases in which the style, the stigma, or the absorbent hairs of the stigma act as organs of ingestion in the process of fertilization. First, of fertilization by means of the style, especially by means of the curious hairs of the style in *Campanula*. The author saw pollen-globules or grains in the hairs of the style, sometimes in remarkable abundance. He regards it as decided that fertilization takes place by means of these hairs; even the retraction (*Einstülpung*) of these hairs could only serve to approximate the pollen to the elongated cells of the central bundle of spiral vessels. Although, after the separation of the lobes of the stigma (*Narbenarme*) pollen reaches the inner side of the lobes which are covered with hairs, and pollen-tubes become there developed, yet fertilization cannot take place by this means, since that condition is but seldom observed. Moreover, the author coated the stigma with a solution of gum, previous to the separation of the lobes from each other, and yet fertilization took place.

"To impregnation of the stigma the author refers all cases in which the formation of tubes from pollen-grains upon a naked stigma, that is, one destitute of hairs, cannot be shown to occur, as in *Petunia*, *Nicotiana*, *Atropa*, &c. The pollen here falls on a mucous covering, which mucus is produced by peculiarly formed mucus-cells.

"Impregnation of the absorbent hairs of the stigma, or of the papillæ upon it, takes place in many plants, as for instance, in *Matthiola annua*, and others. The papillæ consist of three membranes: the middle one is termed by the author the mucous membrane; it is covered with a delicate external membrane, and incloses an internal tube, whose granular contents are coloured brown by iodine. We must here distinguish the impregnation which takes place by penetration of the tubes into the middle membrane of the hair, since the cuticle is in that case wanting, as the author has shown with regard to *Matthiola annua*, in the third part of his *Elements*. Further, impregnation of the absorbent hairs by penetration of the tubes into their cuticle, as in *Glaucium violaceum*; impregnation of the absorbent hairs by absorption, particularly in *Capsella Bursa-pastoris*, a very frequent occurrence; impregnation of the absorbent hairs by contact, as in *Clarkia pulchella*. In all these cases a formation of tubes takes place. Frequently, and especially in those flowers which have the stigma covered with large masses of pollen, we see that only those granules succeed in forming tubes which are restrained by the deeper situated pollen-layers from coming in contact with the surface of the stigma or with the hairs; whilst those granules, which are in

immediate apposition to the latter, yield their contents to the stigma, without developing the least trace of tubes: *Eschscholtzia cristata* affords an example. Lastly, to epigynous impregnation also belongs that form which occurs without the formation of tubes, of which the author consequently never found any example in the majority of *Compositæ*, *Umbelliferæ*, *Lobeliaceæ*, &c.

"The third section treats of perigynous impregnation. On the outside of the ovary of *Reseda odorata*, says the author, at the part to the inside of which the ovules are attached, and accurately corresponding to the course of the placenta, run narrow, pectiniform, elevated striæ of papilliform projecting external cells, running in a direct line from the upper point of union of the pistils, nearly to the base of the ovary. If we examine the flowers of this plant shortly after the successful shedding of the pollen, we find a quantity of pollen adhering to the striæ, which has partly discharged its contents without forming tubes, and not unfrequently penetrates the cuticle by means of a delicate tube, so that a perigynous impregnation in this plant can scarcely be questioned. 'Hypogynous' impregnation is the subject of the fourth section. The coronet of *Passiflora* seems to be intended to assist in fertilization. It is covered with papillæ, like the stigma; the openings of the anthers are directed towards it, in the same way as they usually are towards the receptive organs. Lastly, the author remarks, that those are not always pollen-tubes, which appear to be such, even when they are hanging out from the ovule; as in the *Cruciferæ*, where they are prolongations of the conducting tissue, and in the *Cupuliferæ*, where they belong to the ovule. The former are present before the shedding of the pollen: they are even articulated, and the middle chamber is filled with a clear sap, containing green granules: the latter often originate long after the pollen-shedding, as is the case in *Quercus rubra*."

Mr. Wilson has also observed that pollen-grains penetrate the cavity of the hairs of the style in *Campanula*, as reported by him in Hooker's 'London Journal of Botany,' for 1842.

Monstrous or unusual developments of parts of plants frequently furnish a key to the true character of such parts; witness the monstrous state of *Cerastium* discovered by Mr. Babington and figured by Lindley, and many others. Several curious examples are described in the present volume; some of which we select.

Thesium intermedium, &c.—Reissek describes a monstrosity which "was observed in a specimen of *Thesium intermedium*, and in fact in a plant which was covered with the *Æcidium Thesii*. It showed

the following deviations from the typical form. In the first place, alterations in the carpellary whorl, with normal formation of the other whorls; secondly, alterations in the whorls of both carpels and stamens, with normal or but slightly irregular arrangement of the perigonium; thirdly, alterations in all the whorls, with the formation of simple leaves; and fourthly, alterations in all the whorls, with progressive central restoration of flowers. From a comparison of monstrous plants in all their phases with the allied normal forms, their morphological interpretation is ascertained. It follows, that *Thesium intermedium* which is injured by *Æcidium* in the formation of the stem, attains a higher grade of development, and herein approaches nearest to the character of *Osyris*; and further, that it also, in regard to the production of flowers, stands partly upon a higher scale, and herein approaches to the New Holland forms. From the conformation of monstrous flowers it follows: 1. That the perigonium is capable of a gradual transformation into vegetative leaves; but that the whorls of stamens and carpels retain their characters with greater tenacity, and rather perish than become transformed into vegetative leaves. 2. That the disc disappears with the failure of the stamens, and does not remain like an expansion or margin round the bud generated in the interior of the perigonium; therefore, there is either no special expansion of the axis, or in case this takes place, the expansion is constantly merged in the elongation of the axis."

Peucedanum Oreoselinum.—"On the stem, at a certain height, were observed a quantity of umbelliferous rays, from thirty to forty, which surrounded the stem in a circle; the involucre were transformed into compound leaves. The elongated stem bore a many-lobed bract, from whose axil a single distinct umbel proceeded. The summit of the stem terminated in an ordinary compound umbel. The author therefore believed that in the umbel one ray always represents the axis."

"*Peloria of Calceolaria crenatifolia*, described by E. Meyer. The *Peloria* of this plant presented a bell-shaped tube, and an inverted, funnel-shaped, four-cleft limbus. The pistil was perfect, and developed without the slightest deviation from the normal standard; but the stamens were wanting altogether, without the slightest trace of the situation where they should have grown. The author proceeds to explain the *Peloria* in the following manner: in the natural corolla both stamens stand below the short upper lip; the lower lip on that account appears larger and more vividly coloured, because no stamens arise from it. Should the stamens now be taken completely

away, the equilibrium between the two lips must be restored. The Peloria consists then of a whorl of leaves completely reduced to corolla; and exhibits spots all round the base, because all round no stamens have come to perfection. Neither of the Peloriæ was terminal. The stalk of one was even so much grown together for its whole length with the stalk of a completely normal neighbouring flower, that the calyx of each stood with its back to the other, and both the corollæ were extended almost horizontally."

"*Linaria vulgaris*. Monstrous flowers described by E. Heuffer. A very remarkable monstrosity, and deserving of notice because it is out of the usual routine of metamorphoses. The upper lip of the flower had nothing peculiar, beyond the rudiment of a spur on the dorsal surface. The lower lip was decidedly larger, and was increased by one or two mis-shapen lobes; the throat more swollen and excessively wrinkled. The four stamens were changed into trumpet-shaped tubes. Each individual tube stood out from the throat at a different inclination. The lowest part was like a spur; the middle was set with orange-coloured hairs; the uppermost part was again smooth, and opened in the most various ways. The margin was turned irregularly outwards, and in every single segment differently formed. The rudiment of the fifth stamen had become a similar tube-shaped leaf, which from the inner surface of the upper lip was free, and projected beyond the flowers. This metamorphosed fifth stamen was very delicately formed; quite naked and transparent, of a dilute sulphur-yellow tint. Very often were traces of a sixth and a seventh stamen present, either in the form of a transparent spiculum, or as a delicate pedicle, bearing a yellowish, leaf-like scale. Instead of the pistil, a second flower more or less developed was present. From the description of this Peloria, we see that it is no retrogradation from a normal flower, but an advance towards a more highly developed form of inflorescence."

Campanula persicifolia.—"The leaves of the plant constantly approximated more to the character of flowers as they reached the upper part. The leaves of the stem, from the ninth to the thirteenth, had their margins crisp and wavy; from the thirteenth to the eighteenth they had a blue colour; from the nineteenth to the twenty-third the leaves continually diminished in size, and were of a greenish blue, very pale colour; some were coherent by their margins. A whorl of half-flower, half-leaf-like organs were developed, before the five verticillate stamens appeared. Each of these last bore at its upper and anterior part a two-celled, well-developed anther, whose cells were

filled with pollen not yet granular. Each cell belonged to a half of the leaf, and was divided from its fellow by the midrib. The pollen masses, both on the anterior and posterior surfaces, appeared to be covered by an epidermic membrane. Each cell was divided into two long chambers (concamerations), which were bent inwards at the margin where the anther opened. At the extremity of the axis were three free carpellary leaves; no traces of ovules could be seen."

Delphinium Consolida.—"The corolla (the nectary of Linnæus) was protruded of five petals, and almost regular; the upper petals elongated into spur-shaped appendages, and these petals alternated with the sepals. This flower forms a proof of the views of Jussieu. But indeed they are generally received."

"With general considerations of monstrosities, (the preceding only refer to individual cases) are connected the 'Malformations' collected by Professor von Schlechtendal, in the 'Botan. Zeitung,' part 29, p. 492. 'The four-cleft margin of the corolla of *Syringa vulgaris*,' says the author, 'frequently presents an additional lobe, which is generally not of corresponding size to the rest. In such cases, the number of stamens is also increased by one, and this in consequence of the division of one of them, whose filament curves itself, and on this incurvation appears a little spot which develops pollen. More rarely flowers are observed, and this happens especially in the white-flowered variety, the corollar limbus of which is divided into a number of lobes; from thirteen to twenty-five are sometimes noticed. The stamens are also more numerous in this case; two pistils standing near each other at the base of the flower show that the coalescence of at least two flowers has laid the foundation of this peculiar structure. In *Arctotheca repens*, the author observed three florets of the disc which were united together.'

"'Very frequently,' says Von Schlechtendal, 'we may notice the spiral twisting of the stem of the plant, and also of the leaves, commonly when their development has been interrupted in any way. This twisting often coincides with flattening. In *Triticum repens* the author also remarked a twisting of the uppermost leaf, which he here accurately describes. In roots I have also frequently seen such a twisting.'"

TYNESIDE NATURALISTS' FIELD CLUB.

THE Club held its second meeting of the year on Wednesday, the 16th June, at Castle Eden Dene, and notwithstanding the unsettled state of the weather, the day of meeting was an exceedingly pleasant one; for although rain fell abundantly in many places not far distant, the weather at Castle Eden was delightful. This Dene, celebrated throughout England for producing that beautiful and singular flower, the lady's-slipper (*Cypripedium Calceolus*), besides many other rare plants, and other objects of natural history, is remarkable also for the beauty of its scenery, and the luxuriance of its vegetation. The first meeting of the year was held at Morpeth, and the scene of the rambles of those members of the Club who were present, was on the banks of the Wansbeck, from Morpeth to a little below Bothal; and at this meeting, as well as at the second, the party had a very beautiful day to add to their enjoyment of scenery, which, for quiet beauty, is seldom exceeded. The usual plan of the Club is to assemble to breakfast at some inn conveniently situated near the place of meeting, then to have their excursion, and to dine afterwards at such place and hour as may be agreed upon. When, however, the distance from home is too great to allow time for this, each party provides for himself, and dines in the open air. At the meetings at breakfast and dinner, when there is time, announcements are made of what parties have done in those branches of natural history which each may pursue, papers are read, and the proceedings of the committee are reported. When the papers are too long, then they are read at an evening meeting, held for that purpose, in the rooms of the Natural History Society of this town. One leading object of the Club is the formation and printing of correct lists of the various natural productions of the counties of Durham and Northumberland, with localities, descriptions of new species, and such observations as may be deemed necessary. It is also in contemplation to draw up and publish a succinct account of the Geology of the district, with lists of the fossils occurring in different formations. These various papers, although necessarily printed separately in the first instance, will, when complete, form a continuous series in that order which may be considered the best. The first part of the Club's publications will comprise the proceedings for the last year, several interesting papers, and a list of the Coleoptera and of the Molluscos animals. Other portions of the Entomology and the Botany are in active preparation.

As it is the intention of the Club to promote the investigation of the natural history of the district as much as possible, they intend to sell their publications separately, as well as together, in order to accommodate those pursuing different departments of the science. Whilst, however, they will further as much as they can the investigation of the nature both of the crust of the earth itself, as well as of the various living beings which it produces, they will prevent, as far as their power may extend, the extirpation of any species or race, being aware that such an event cancels a chapter as it were in the natural history of the district. The Club now numbers between eighty and ninety members, and is still increasing, and when the nature of its objects is understood, we can have little doubt of its future prosperity. In conclusion, we may be permitted to imagine how efficiently the natural productions of other districts might be investigated by similar institutions. The Berwickshire Naturalists' Club has long been in existence, and much information respecting the natural history of the banks of the Tweed and its neighbourhood has been obtained by its labours; and if the example were followed and carried out in other districts throughout the kingdom, we should thus have a better means of forming one good account of the natural history of the country than could otherwise be well come at.

Third and Fourth Field Meetings.—The third meeting of the year took place in a range of country extending from Haydon Bridge to Walltown and Haltwhistle; a district highly interesting to the geologist and botanist, and also to the antiquary, from its possessing the most extensive remains of the Roman wall now in existence. The face of the country is very much broken by irregular hills of limestone or sandstone; and at Walltown, and from thence towards the north, the edge of the great Whin Sill shows itself, after having been thrown down by the great Stublick Dyke. In the hollows are numerous bogs or mosses, and here and there a small lake. As might be expected, many of the plants peculiar to such districts are found here in abundance, amongst them some of our rarer British species. Several scarce species of *Carex* occur, especially *Carex irrigua*, which was first noticed as a British plant in this district by Mr. John Thompson, then of Crowhall Mill, and who has added many species observed in the neighbourhood alluded to, to the Northumberland Flora. Amongst them may be enumerated *Hieracium prenanthoides*, and *Crepis succisæfolia*. The day was remarkably fine, and the party, after a pleasant wander, reached Haltwhistle just in time for a hasty dinner, and to get home by the last train from Carlisle. The

fourth meeting was held at Prestwick Car, near Ponteland, a space of flat, marshy and boggy land, about two miles across, with a considerable pool of rather shallow water, communicating with the little river Pont by a deep ditch, of about one-third water and the remaining two-thirds of filthy mud. It is difficult to account for this flat expanse of bog, marsh, and water. That it has once been more elevated is evident, as the stumps of trees, blackened, as is usual in bog-wood, are scattered over its whole surface. When the lake is low, they may be seen in considerable numbers, just showing themselves above the surface of the water. Two sorts of tree may be distinguished: a species of fir, probably the common Scotch fir, as the wood when sliced and put under the microscope appears to belong to that plant. The other tree is the common birch; in this the bark is remaining, in many cases almost quite sound, whilst the wood is soft, or altogether gone; thus furnishing us with the means of accounting for the fact, that in most of the larger fossil plants of our coal mines, we have the impressions of the bark only, the place of the wood being usually occupied by mud or sand. How the trees at Prestwick Car have got into their present situation it is difficult to say; the appearance of the place, an extensive flat, like the bottom of a large dish, rising ground on nearly all sides forming the edge, would suggest the idea of subsidence of the land at this particular spot, more especially as the Car itself is on so low a level, that the waters of the Pont frequently flow into it. As might be expected, numerous water and bog plants are to be met with; for some it is the only convenient station near Newcastle. In the ditches, as well as in the lake, *Callitriche autumnalis* and *Chara aspera* and *hispida* are abundant. Amongst the other plants may be mentioned *Ranunculus Lingua*, *Listera cordata*, *Cephanthe Phellandrium*, *Triglochin palustre*, *Alisma ranunculoides*, *Hippuris vulgaris*, *Utricularia vulgaris* and *intermedia*, *Carex pauciflora*, *Potamogeton lucens* and *heterophyllus*, *Anagallis tenella*, *Parnassia palustris*, *Nuphar lutea*, *Eleocharis multicaulis*, *Andromeda polifolia*, *Habenaria bifolia*, *Gymnadenia conopsea*, *Pilularia globulifera*, *Lycopodium Selago* and *selinoides*, and most of the common North-of-England heath and bog plants, both cryptogamic and flowering. Many fresh-water shells are found in the lake and the ditches which run into it, but they do not appear to be so numerous as they were found some years ago. At one time the Car was not preserved, and water-birds were driven away, and the shells on which they fed were abundant, but now that the place is strictly preserved, the birds abound, and the shells ap-

pear to have become scarcer. Water-birds, as might be expected, have resorted in great numbers to the Car since they have been less disturbed, and this year they appear to be more numerous than usual. Several species also have bred in greater numbers this season than usual, and some have bred which had not been previously noticed at the Car in the breeding season. Several broods of the redshank were brought out, the water crake bred there this season, and a ruff and reeve were seen by Mr. R. Reay, of Berwick Hill. Mr. John Hancock, by whom this information is furnished, obtained the egg of the redshank. Amongst the other birds seen was a flock of about thirty ring-dottrels, a number unusually large to be seen together at Prestwick Car. The only business transacted at the meeting was the election of four new members, and the presentation, by Mr. J. Hancock, of a Notice of the Capture of the Thrush Nightingale (*Sylvia Turdoides*, Meyer), the largest European warbler, near the village of Swalwell, three or four miles west of Newcastle. The attention of Mr. Thos. Robson, of Swalwell, a gentleman perfectly acquainted with the notes of our different warblers, was, towards the end of last May, attracted to a note which he did not recognize. After some trouble he succeeded in seeing, and afterwards in obtaining the bird, which proved to be the male of the species above named. Although this was the only specimen obtained, yet, from the time of year and other circumstances, there is little doubt that this fine warbler is a regular visitant, its peculiarly retired habits having hitherto concealed it from observation. Mr. Hancock has in his possession an egg obtained in Northamptonshire, which agrees exactly with the description of the thrush nightingale, but from not supposing the bird to be a native of England, Mr. Hancock was unwilling to assign the egg to this species; now, however, that the bird has been obtained here in the breeding season, there seems no reason to doubt that it breeds also in Northamptonshire.

BOTANICAL SOCIETY OF LONDON.

Friday, September 3.—J. E. Gray, Esq., F.R.S., President, in the Chair.

Donations to the Library were announced from Dr. Steele and the Rev. G. H. Stoddart. British plants had been received from Dr. Dickie, Dr. Dewar, Mr. Fitt and Mr. Maw. Mr. Alexander Irvine,

of Guildford, Surrey (Honorary Secretary of the Surrey Natural History Society), and Mr. G. Maw, of Richmond, Yorkshire, were elected members. Mr. James Hussey presented a specimen of the *Phalaris*, from a field near Swanage, Dorsetshire, found by him in July last, reported as *P. utriculata* (*Linn.*) in 'London Journal of Botany,' September, 1847; but which Mr. Hewett Watson considers to be perhaps rather *Phalaris paradoxa* (*Linn.*), of which he possesses no authentic specimen for comparison with the Dorset example. Mr. Borrer presented specimens of *Malva verticillata* (*L.*), (*Phytol.* ii. 934).

Read, "Description of *Hieracium heterophyllum*" (Bladon's MSS.), by Mr. James Bladon (*Phytol.* ii. 961).—*G. E. D.*

Description of Hieracium heterophyllum, a Species new to Science.

By JAMES BLADON, Esq.*

Hieracium heterophyllum, Bladon's MSS.—Leaves all sessile, cauline, lowest lanceolate, upper ovate acuminate.

Situation.—Woods, hedge-banks; very rare in open ground.

Time of Flowering.—Middle and latter end of August and September.

The height of the plant varies very much, from ten or twelve inches to three feet and a half, or more: the fibres of the root are stout, cylindrical, not tapering, from two to six inches long; stem stout, at the base of the larger plants $\frac{1}{2}$ of an inch in diameter, striated, very brittle, internally filled with shining, rather largely cellular pith, thickly clothed with slender, whitish, downy or silky hairs, intermixed with a few dark ones, from one to two lines in length, erect, spreading, or a little deflected, springing from an enlarged, oblong, glandular base, close to the surface of the stem a thinly scattered, arachnoid pubescence, which, being generally darkish coloured, gives a smoky appearance to patches on the plant, especially as the stem and branches are very apt to have one side clouded with purple. In the branching of the stem it very much resembles *maculatum*, the smaller plants only bearing six or eight flowers, while the larger ones have axillary branches down to the middle of the stem.

Leaves various, none radical, all cauline (thus in an early stage bearing a very different appearance from *murorum* and *maculatum*,

* Read before the Botanical Society of London, 3rd September, 1847.

in which species the first appearance of the plant is several radical leaves close to the surface of the ground, and when they are from one to two inches long the stem begins to spring from the centre of them; but in this species, when the plant is only half an inch in height, the leaves are distinctly seen to be attached to the stem and not to the crown of the root; the lower leaves are lanceolate, pointed at the apex, attenuated towards the base, so that the broadest part of the leaf is above the middle, from four to five inches and a half long, and from five to seven-eighths of an inch in breadth; the leaves higher up the stem decrease a little in size, and become more regularly lanceolate; at about the middle of the stem the leaves have their base ovate, and apex acuminate, in many instances attenuate-acuminate; the ovate base is not truly clasping, the basal part of the midrib being enlarged, causes the leaf to bear the appearance of clasping the stem. When the plant is in flower, from two to four of the lowest leaves are decayed; all the leaves have a few small, scattered teeth on their edges, directed forwards, from half a line to a line in length, half an inch or more apart in the larger leaves, and about half that distance in the smaller ones; the under side of the leaves, especially the midrib, is clothed with the same description of hairs as the stem; the leaves are liable to be clouded with purple around their edges, not so much in spots or blotches on the disk as *maculatum*. It requires great care in gathering and handling the plant when in a fresh state, to prevent the downy hairs of the stem from being obliterated or pressed down flat on the stem, when they become felted together, and form a flat, woolly pubescence, which may mislead the observer as to its true character. One remarkable characteristic of the present plant is the disposition of the leaves on the stem: at about one-third or one-fourth of the height of the stem from the root it is so much more densely leaved than in any other part, in plants from twelve to twenty inches long there are as many as eight to twelve leaves within the space of three inches in the part alluded to, whilst probably there are not many more than that number on all the rest of the stem. In the very large specimens this is not quite so conspicuous, yet even in them it may be traced, the leaves being inserted about half an inch apart: above and below they are from one inch and a quarter to two inches apart. In the middle-sized and small specimens it is very plain, even in plants of only two or three inches in height.

The flowers are about the size and colour of those of *maculatum*, not being so large as in *murorum*; the pistils and stigmas are more prominent than in either of the above species; the scales of the involucre

are attenuated towards the point, with two to four inserted on the stem, under the flower; the peduncles and scales of the involucre are densely covered with the same sort of hairs with glandular bases, as the stem; the arachnoid pubescence is also more dense; the capitate glands so conspicuous on the flower in murorum, are very rare in this plant; the bracteas are ovate-acuminate, same as the upper stem leaves, but narrower in proportion; the seeds are longitudinally-ribbed, with their down rough when fully ripe; the scales of the involucre are reflected close to the stem.

JAMES BLADON.

Pont-y-Pool, August 31, 1847.

Note on the Viola flavicornis of Smith.

By EDWARD FORSTER, Esq., V.P.L.S.

IN the 'Phytologist' (Phytol. ii. 855), in the report of the Meeting of the Botanical Society, on the 7th May, you say "Mr. Watson remarked that small specimens of the ordinary *Viola canina* had been erroneously figured in the 'Supplement to English Botany' for the *Viola flavicornis* of Smith, and that Mr. Babington persisted in repeating the same in the second edition of his Manual (published that day), although he could not fail to know that the application of Smith's name, 'flavicornis,' to the plant of the Supplement was an error on the part of Mr. Forster."

Mr. Watson, in his 'Cybele Britannica,' p. 178, under "135 d. *Viola flavicornis*, *Smith*," and "135 c. *Viola lactea*, *Smith*," makes the following statement: "Unfortunately dwarf examples of *V. canina*, differing from the typical form in size alone, have been repeatedly mistaken for Smith's *V. flavicornis*; and Mr. Forster has done his best to perpetuate this error, by publishing some such dwarf examples of *V. canina*, under the name of *V. flavicornis* in the 'Supplement to English Botany,' plate 2376" (2736). "And apparently misled by that plate, Mr. Babington has extended the error by referring to the plate as a figure of the true *V. flavicornis* of Smith, and likewise of his own variety 'pusilla.' He should have omitted the reference to '*Sm.*,' the plant of Smith being a different thing, and not agreeing with any of the varieties recorded in the Manual, though coming between *montana* and *Ruppia* of that work."

Mr. Watson has kindly furnished me with specimens, both of his

V. flavicornis and of that which he considers *V. canina*, var. *pusilla*. After the best investigation I can give, I am still of the same opinion as when I drew up for Mr. Sowerby the letter-press, No. 2736; indeed, I may say, that opinion is not lessened, but strengthened by the examination of Mr. Watson's specimens, and therefore I now boldly venture to assert that *V. flavicornis*, E. B., *V. canina*, β . *pusilla*, Bab. Man., 2nd ed., p. 36, is the plant intended by Smith. The two figures in E. B., and the figure in Dillenius's edition of Ray's Synopsis, t. xxiv. f. 1, well represent the specimen preserved in Smith's own herbarium. I might have recourse to recollected conversations with Sir J. E. Smith, were I not aware that such ought not to be resorted to when we have authentic documents to rely on.

The plant considered by Mr. Watson as *V. flavicornis* appears to me to be one which I have long known, yet never could make up my mind whether to consider as a variety of *V. lactea* or *V. canina*, but as it most resembles the former, I agree with Mr. Watson in thinking it not unsafe to refer it to that species, as he does in 'Cybele Britannica.' It is not improbable that this may be intended by *V. canina*, var. *montana*, in the Manual, but it must be observed, that the *V. montana* of Linnæus is a very different plant, of higher growth, with larger, narrow leaves, never yet observed in Britain except in gardens. *V. Ruppil* I have always supposed identical with *V. lactea*, *Smith*; scarcely a variety.

In thanking Mr. Watson for the communication of the specimens of the two plants, I have already stated to him privately my present sentiments, and I am well convinced he will think that I cannot conscientiously do otherwise than give the same to the public through your useful periodical.

EDWARD FORSTER.

Woodford, 7th September, 1847.

[It is perhaps as well to mention that the Reports of the Meetings of the Botanical Society of London are official, being kindly transmitted by the Secretary, Mr. Dennes. We invite attention to this, because Mr. Forster's introductory observation would imply that these Reports were editorial.—ED.]

Note on Dr. Hartig's New Theory of the Fertilization of Plants.

By WILLIAM WILSON, Esq.

IN this department of science it is far more easy to speculate than to make discoveries, and I fear that until more facts are obtained, and the reputed facts more thoroughly established, theories will only tend to mislead. It is incumbent on me here to make a confession of error on an important point connected with that part of Dr. Hartig's theory which treats of fertilization by means of the style. I do so with less hesitation now that my former statements (which were neither hastily nor carelessly made) have been confirmed by such highly respectable authority. I have waited for years in full expectation that some one would spare me the task of self-refutation.

True it is, that the pollen-grains of *Campanula* do enter the hairs of the style, and that they are sometimes to be found (*e. g.* in *Campanula Rapunculus*, where the hairs are of greater diameter) in considerable abundance; but the manner in which they get there is the question. During my prolonged examination (continued without intermission for days) I was not unaware of the danger of making false deductions, and I thought that I used sufficient precautions against them; but after all, I am now persuaded that an error (a pardonable one, as I hope) must have been committed; for I could not, in the following year, detect a single pollen-grain in the hairs of any style previous to dissection, and I had already ascertained that pollen-tubes are developed in the usual mode upon the stigma of *C. Rapunculus*. It is my present opinion that the pollen-grains obtain access to the interior of the hairs of the style precisely at the moment when the sections are made with the cutting instrument, and that they enter at the base, which then becomes open and exposed, and not at the apex.

Of course, I cannot join with Dr. Hartig in regarding it "as decided that fertilization takes place by means of the hairs;" nor is it yet sufficiently clear to me, though it is not improbable, that the retraction of the hairs (which, however, does assuredly cause a species of absorption of the pollen-grains into the substance of the style) is essentially productive of fertilization, on the part of the included pollen-grains, which do not (so far as I have observed) put forth tubes within the usual period of fecundation, nor for a considerable time afterwards, if at all; nor do they appear to be otherwise altered.

W. WILSON.

Orford Mount, September 1, 1847.

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P. S. — After a renewed and most gratifying examination of *Campanula rotundifolia* this morning, I can now testify that the stigma is the true channel by which fertilization is effected. I have traced the pollen-tubes in abundance from the stigma downwards, in unbroken continuity, to the distance of half an inch; and the evidence of their being prolonged until they penetrate the ovule is so exceedingly strong that I now fully admit and believe the fact. The course of the tubes from the base of the style is by a sudden turn from the upper part of the point of junction with the placenta, passing outwards between two contiguous surfaces in the centre of the mass to the upper part, and thence over the whole surface of the placenta, to which the foramen of each ovule is closely applied; hence it is not difficult to detach an ovule with a tube of six times its own length still adhering to the foramen. This I have repeatedly done. Sometimes a tube appears to pass close to the foramen without entering it, or otherwise two tubes enter the foramen. I cannot account for my not having seen this before, except through my not having dissected the ovarium in a sufficiently advanced state. The tardy admission of one who has been so long sceptical will perhaps be thought conclusive; but any microscopist may verify my observations with a lens of moderate power. The stigma obtains its pollen by its branches becoming revolute, when its surface comes into direct contact with the pollen-grains, already profusely scattered upon the upper part of the style. Thus an ingenious theory fails of one of its main supports, if it be not altogether refuted.

W. WILSON.

Orford Mount, September 8, 1847.

Remarks on Polygala depressa of Wenderoth.

By W. A. BROMFIELD, M.D., F.L.S.

Polygala depressa. — A plant exactly answering to the description given of *P. depressa* of Wenderoth, the *P. serpyllacea* of Weihe, I found in May, 1846, growing sparingly in bare, gravelly spots on Bleak Down, an elevated tract of barren heath on the road from Newport to Niton, in this island, and which, so far as I am aware, has not been noticed in England even as a variety of the common milkwort (*P. vulgaris*, L.), in which light I was then, and still am disposed to regard it. Absence abroad up to a period much too late

in the present year for renewing the search after fresh specimens, and a desire to investigate the plant more completely than I had an opportunity of doing so short a time before leaving this country, have induced me to delay sending an account of it to the 'Phytologist' till now. Hence also, my remarks must be confined to the very few original examples of 1846, which were then placed in my herbarium under the above names for future examination; these, however, leave no doubt on my mind of their perfect identity with the presumed species of the authors whose names have just been quoted. I could wish my convictions were equally clear of the specific distinctness of our plant from *P. vulgaris*; the notoriously polymorphous tendencies of which forbid my hazarding any positive opinion on the point, and counsel me to adopt the safer course of assuming both to be one and the same thing, rather than help to burden our English catalogues with another of those dubious *book-species* with which, unhappily for the interests of the science, they are so much encumbered already.*

The characters that distinguish *P. depressa* from *P. vulgaris* are fully as satisfactory, if not more so than those which are used to separate the latter from its near allies enumerated in the subjoined note. It should, however, be observed that its affinity is rather to *P. amara* than to *P. vulgaris*; the former of these is not now considered a native of Britain, the *P. calcarea*, *Schultz*, having been mistaken for it, if, indeed, the two are not identical, as I more than suspect them to be, from the slightness of the marks employed to discriminate them.

In perfect accordance with the descriptions of Koch and others, my specimens of *P. depressa* differ from *P. vulgaris* in the slenderer root? and diffuse, prostrate, almost filiform stems, which lie quite flat upon the ground, and spread in every direction, with irregular, wiry branches, which, as well as the principal stems, are for the most part closely beset with leaves at their base or about the middle of their length; the older occasionally bare of leaves below, from the falling away of the latter through time. Leaves (in my *fresh* specimens) yellowish green, leathery and shining, the lower and middle oblong-elliptical or obovate-elliptical, obtuse or very slightly pointed, crowd-

* Whoever will be at the pains of comparing together specimens, plates and descriptions of *P. vulgaris*, *amara*, *comosa*, *austriaca* and *calcarea*, with the innumerable variations in the size, shape and colour of the flowers and leaves of each, and the diversity of opinion in authors concerning them, must be sensible of the reasonableness of withholding a too ready assent to authority that would dissever forms so intimately commingled or anastomosing.

ed, opposite or alternate, mostly increasing in size as they ascend up to a certain point, beyond which they again diminish, and finally become longer and narrower, or elliptic-lanceolate, more remote, alternate or scattered; racemes terminal and lateral, comparatively with *P. vulgaris* few-flowered and short; flowers small, bluish white (rarely deep blue, *Koch*); lateral enlarged sepals (wings) oblong-obovate, scarcely pointed, their lateral nervures considerably ramified and confluent towards the margin, anastomosing with the central nerve by an oblique branch or two of the latter, generally towards its apex.*

Since some botanists may be disposed to regard our plant as constituting a good species, I subjoin the following diagnostic formula:—

Polygala depressa.—Stems depressed, filiform, branched, leafy; lower leaves mostly crowded, oblong or obovate-elliptical, obtuse, upper leaves lanceolate, scattered; racemes short, few-flowered; flowers crested, lateral sepals (wings) oblong-obovate, their lateral nerves reticulate, anastomosing with an oblique branch of the central nerve.

P. depressa, Wend., *Koch* in *Röhlings's Deutschland's Flora*, v. 72 (excellent description). *Cosson et Germain*, *Flore des Environs de Paris*, i. 56, and *Atlas de la Fl. de Par.* tab. 8, fig. B. *P. serpyllacea*, *Weihe*, *Reichenbach*, *Flora Germanica Excursoria*, No. 2398.

Polygala depressa is given as occurring in various parts of France and Germany, on heaths, moors and spongy, turfy ground. I will only further remark that from its peculiar habit it looks more like a species than most of its allies, although, like them, good *structural* differences seem wanting to its undeniable establishment as such.

WM. ARNOLD BROMFIELD, M.D.

Eastmount, Ryde, Isle of Wight.

September 8th, 1847.

* I am disposed to lay but little stress on the neuration of the wings or enlarged lateral sepals, finding this character liable to considerable irregularity on the same specimen.

Crepis setosa and Atriplex hortensis near Saffron Walden.

By GEORGE STACEY GIBSON, Esq.

IT may interest some of the readers of the 'Phytologist' to know that *Crepis setosa* has again appeared abundantly in several clover fields in this neighbourhood, quite in a different direction to that where it was first discovered four years ago. It has probably been originally introduced with seed from abroad, but is likely to become established as a naturalized plant, having now been found in various parts of the country.

Atriplex hortensis was also found a few days ago, by my friend J. Clarke, on a heap of manure near the town. It is not near any garden, and I am not aware that the plant is now cultivated here, but probably the seeds have lain dormant for some years, and have vegetated on being brought to the surface. Of course it is not likely to be indigenous, but having found its way into some recent British floras, it may be well to record a fresh station for it. The size of the plant with its large and peculiar capsules render it very conspicuous. There are several plants of it, but it is confined to a small space of ground.

G. S. GIBSON.

Saffron Walden, 9 Mo., 11, 1847.

Notice of a few of the rarer Warwickshire Plants.

By THOMAS KIRK, Esq.

I SEND you a list of the rarer plants of this neighbourhood that have fallen under my notice. I have purposely omitted mentioning any localities which have been previously given in the pages of the 'Phytologist,' and have confined myself solely to those of which I could not find any record.

Ranunculus Lingua, L. By the side of an old canal near Coventry Wood, and in a boggy place near fir-tree grove, Arbury Hall.

Iberis amara, L. In a ditch at Exhall.

Reseda fruticulosa, L. On ground from which eight or ten feet of the surface-soil has been removed, at the new water-works, Coventry.

Geranium phæum, L. In a wood near Coton House.

Oxalis corniculata, L. In a garden at Foleshill.

Rhamnus catharticus, L. Pinley.

———— *Frangula*, L. Arbury deer-park.

Ononis spinosa, L., *O. antiquorum*, L. ? Bab. Man. Near Coventry Wood ; Arbury Hall.

Lathyrus sylvestris, L. Near Arbury Hall.

Sanguisorba officinalis, L. Not uncommon ; Binley ; Arbury Hall ; Pinley ; Stivichall.

Pyrus communis, L. Stivichall ; near Arbury Hall.

Epilobium angustifolium, L. By the side of the London and North-western railway ; near Whitley Common.

Enothera biennis, L., with *Reseda fruticulosa*.

Callitriche platycarpa, Kutz. Boggy places on Whitley Common ; near Radford ; in water at Stoke.

——— *pedunculata*, β . *sessilis*, Bab. Stagnant waters in Arbury deer-park.

Bryonia dioica, L. In thickets and hedge-rows, not uncommon ; Coventry park ; Radford ; Binley ; Stivichall ; Stonleigh, &c.

Ribes nigrum, L. In a boggy spinney, called "the Alders" ; Arbury deer-park.

——— *rubrum*, L. Coventry Wood ; Arbury Hall.

Sedum album, L. On a wall at the back of Little Park-street, Coventry.

Petroselinum sativum, Hoffm. Kenilworth Castle ; walls at Spon End, Coventry ; in a deep rocky cutting on the London and North-western railway ; near Whitley Common.

Centranthus ruber, D. C. On a wall near Kenilworth Church.

Hieracium sylvaticum, Sm., *H. vulgatum*, Fries. On the old town-wall ; on walls near the Charter-house, near Coventry ; on walls and banks at Arbury Hall ; sparingly on banks at Berkswell ; Keresley.

——— *sylvaticum*, γ . *pictum*, Hook. Plantations, &c., near Arbury Hall.

——— *boreale*, Fries. Stoke Heath ; on Stair Bridge.

Carduus pratensis, L. Coleshill pool.

Senecio squalidus, L. Naturalized on walls at Allesley.

Campanula patula, L. Near Artley ; near fir-tree grove, Arbury Hall ; Willenhall lane.

——— *Rapunculus*, L. Not very uncommon in old gardens &c. ; abundant in the pleasure grounds, Arbury Hall.

Wahlenbergia hederacea, Reich., with *Anagallis tenella*. On spongy turf near Arbury Hall ; *possibly* planted, but I think it truly indigenous to this locality. It is *not* cultivated in the gardens at the Hall, and so far as I can learn, never has been.

Veronica Buxbaumii, Ten. Fields and gardens in Coventry park.

Veronica polita, Fries. Not uncommon in Coventry park; Stonleigh.

Physalis Alkekengi, Willdenow, is naturalized on waste ground at Foleshill.

Verbascum nigrum, L. Baginton.

Antirrhinum majus, L. On the old town-wall near the Cook-street gate, Coventry; walls at Stonleigh Abbey.

Linaria Cymbalaria, Mill. Walls at Warwick; New House, Radford; Whitley Abbey; on a roof at Springfield; walls at Arbury Hall; Coton House; near Rugby, &c.

Limosella aquatica, L. In water near Arbury Hall.

Orobanche major, L. On the roots of broom in Whitley grove. This plant was abundant in 1845 and 1846, but this season I could only find a single specimen.

Lamium Galeobdolon, Crantz. Stonleigh Woods; near Arbury Hall; Radford; Keresley, &c.

Myosotis caespitosa, Schultz. Watery places on Stoke Heath; Whitley Common; Coventry park; Arbury deer-park.

———— *sylvatica*, Hoffm. In plantations, &c., near Arbury Hall.

Colchicum autumnale, L. Pinley.

Potamogeton lucens, L. In an old canal in Arbury deer-park; in the Oxford canal, Stoke Heath.

———— *gramineus*, L. Waters near Arbury Hall.

———— *rufescens*, Schrad. Stagnant waters in Arbury deer-park.

Lemna gibba, L. Ditches and ponds about Foleshill; in a pond near Berkswell, &c.

———— *polyrhiza*, L. In a pond at Berkswell; near Radford; ponds near Stoke Heath.

———— *trisulca*, L. In a deep pond at Stivichall; stagnant waters on Stoke Heath; waters near Arbury Hall.

Acorus Calamus, L. Abundant in most of the waters near Arbury Hall; in two ponds at Foleshill, but originally planted with roots from a pond near the Stoke race-course, which is now filled up.

Typha angustifolia, L. In an old pit at Coton; Stivichall; Burn post.

Luzula multiflora, Lej. Not uncommon, Coleshill bog; Arbury woods; Brandon woods.

Eleocharis acicularis, Sm. In water near Arbury Hall; Stoke Heath.

Carex Pseudo-cyperus, L. Sides of ponds and waters near Arbury Hall; Pinley; near Stoke Heath.

Arundo Epigejos, L. Brandon woods; near Arbury Hall.

Cystopteris fragilis, Bernh. Near Arbury Hall.

Equisetum sylvaticum, L. On the borders of a wood, and in a corn-field near Arbury Hall.

THOMAS KIRK.

Cross Cheeping, Coventry,
September 11, 1847.

On the occurrence of Lycopodium annotinum in Cumberland.

By H. ECROYD SMITH, Esq.

BELIEVING that the plant has not previously been noticed growing in England, I have the pleasure of communicating the discovery of *Lycopodium annotinum* on one of the precipitous sides of Bow-Fell, Cumberland; also of *Silene acaulis* above Grisedale Tarn, on the Helvellyn side.

The catkins differing somewhat from those represented in 'History of British Ferns,' I take the liberty of enclosing a specimen, and shall feel much obliged by an explanatory line when convenient.

H. ECROYD SMITH.

Bay Cottage, Ambleside,
September 10, 1847.

[The occurrence of *Lycopodium annotinum* in England has already been recorded in the 'Phytologist' (Phytol. ii. 824). The specimens in that, as in the present instance, are unquestionably correctly named. There is no other difference between the catkins on the specimen obligingly transmitted with the present communication and that figured in the 'History of British Ferns,' than that arising from the different stages of maturity in which the two have been gathered. The figure represents the catkins *mature*, the specimen now received has them in a half-grown state.—E. Newman].

Remarks on Centaurea nigrescens, Malva verticillata, and Euphorbia Peplis. By JAMES MOTLEY, Esq.

Centaurea nigra, *C. nigra*, β . *radiata*, and *C. nigrescens*.—Having resided for several years near Aberafon, in Glamorganshire, where a *Centaurea* with radiate flowers, I believe *C. nigrescens* of the second edition of Babington's Manual, is extremely common, and grows con-

stantly intermixed with the usual form of *C. nigra*: I have had many opportunities of observing their habits and appearances. I may premise that this supposed *C. nigrescens* is very unlike a radiate *C. nigra* which I once found in Carmarthenshire, and Mr. Borrer, to whom I showed my specimens last autumn, declared it not to be *C. Jacea*. It differs from *C. nigra* in the following points:—

The involucreal appendages in *C. nigra* are pectinate in a pinnate, in *C. nigrescens* rather in a palmate, manner. The leaves of *C. nigrescens* are correctly described in the Manual as linear-lanceolate, but as far as I have seen, the lower ones are scarcely ovate, but rather ovate-lanceolate, sinuate dentate almost up to the flowers, while those of *C. nigra* are often all entire, except the very lowest. The characters from the pappus I fear will be found dubious, as I have now before me seeds of *C. nigra* which would answer all the three descriptions in the Manual, unless indeed that character refers only to the outermost seeds in each head. The difference in habit between these two plants is very striking; *C. nigra* is for the most part an erect slender-stemmed plant, with rather sparse foliage; the stem of *C. nigrescens* is decumbent below, much shorter, thicker, and more leafy, and has usually several leaves nearly close together immediately below the flowers; the heads, too, are larger, and I believe *always* radiate. The specimen of *C. nigra*, *β. radiata*, to which I have referred, had quite the habit and appearance of the normal *C. nigra*, not of *C. nigrescens*, but having unfortunately been unable to preserve it when gathered, I cannot speak to the form of the calyx appendages.

Malva verticillata.—I must beg to correct a slight inaccuracy in the notice of this plant, both in the 'London Journal' and in the 'Phytologist,' viz., that "very few specimens have been found;" when I first observed it, there were many hundreds of specimens, scattered over three fields, though most abundant in one: it is true that when Mr. Borrer accompanied me to the spot last autumn, we could only procure five specimens, of which two were only seedlings, but it has this year appeared again in considerable abundance; I have procured about one hundred specimens, besides leaving quite as many, being anxious that the plant should not be exterminated. I have found several specimens in an old quarry adjoining the field: these are only an inch or two high, with solitary flowers, while some in rich soil in my garden were upwards of three feet, and the flowers in dense clusters. I cannot believe this plant to be either a variety or the type of *M. crispa*: with the seeds of that plant I am unacquainted, but its ramification is very different from that of *M. verticillata*; when the

latter does branch, which is rarely (unless injured, as in several specimens which have been cut down with the corn), the branches are always spreading, and from the lowest part of the stem only, even in my very luxuriant garden specimens; whereas *M. crispa* has, when well grown, axillary ascending branches for some distance up the stem, and is altogether a much larger plant: to use a familiar comparison, *M. verticillata* resembles a holy-oak, *M. crispa* a Lombardy poplar.

Euphorbia Peplis.—In 1834, when quite a boy, I found this plant growing abundantly on sand-hills, at Porth Cawl, in Glamorganshire, accompanied by *Lavatera arborea* and *Tamarix anglica*. In 1841 I sought in vain for the two former, and on my last visit to that place in the autumn of 1846, the *Tamarix* also had disappeared.

JAMES MOTLEY.

Llanelly, Carmarthenshire,
September 13, 1847.

Welch Habitat for Asplenium germanicum. By EDWARD NEWMAN.

THREE years have elapsed since I received an anonymous letter, beginning thus, "A Lady who has this season visited North Wales," &c., and then stating that she had found *Asplenium septentrionale* in great abundance, and also unmistakeable specimens of *Asplenium germanicum*: the locality was carefully and obligingly given with the view of conducting me to the spot. As far as regards *A. septentrionale*, I knew the statement to be correct, and had no reason whatever to doubt the more extraordinary fact of *A. germanicum* having occurred in Wales, other than the feeling of uncertainty whether the nameless lady actually knew the plant which she so called.

The matter is now set at rest. I have before me a veritable specimen of *Asplenium germanicum*, gathered (at the very station pointed out by my anonymous correspondent) by Mr. H. Wilson, and obligingly transmitted for my inspection by Mr. W. Wilson, of Warrington.

"In August, 1838, I had the good fortune to find *A. septentrionale* in luxuriant profusion on a wall by the road-side, going out of Llanrwst, towards Conway: the station is on the left-hand, exactly opposite a farm-yard, and about a mile from Llanrwst." Thus I wrote in 1840, and botanists, taking this direction in their hands, rushed to the spot, and although I should have supposed all the herbaria in Europe might have been supplied from that station, yet the fearful spirit of devastation was so strong upon them, that the plant is totally

eradicated. I think it will not be deemed extraordinary or eccentric after such an instance, if I merely record that *Asplenium septentrionale* still exists near Llanrwst in very great profusion and luxuriance, in enormous tufts, readily to be removed from between the stones, and that *Asplenium germanicum* occurs more sparingly.

While on the subject of these *Aspleniums*, I may perhaps be allowed to introduce to the notice of the readers of the 'Phytologist' the following interesting note from Mr. Smyttan, of Cambridge:—

"After reading to-day your remarks in your very interesting work on British Ferns, on *Asplenium alternifolium*, I have thought it might be interesting to you to know that I found a specimen of this very rare plant on Stenton Rock so lately as last summer. After two hours' climbing on the bare rocks in one of the most burning days, I at last found the treasure in a fissure of the barest part of the rock. I am sorry I cannot send you a part of the specimen, as it was a very small plant, and I gave a friend one half, the other I have in my small collection.

"*Septentrionale* grows in great abundance on this rock.

"GEO. HUNT SMYTTAN,

"of C. C. Coll. Cambridge."

EDWARD NEWMAN.

London, September 16, 1847.

Notes on the affinity between Lysimachia nemorum (Linn.) and *Lysimachia azorica* (Hornem.). By HEWETT C. WATSON, Esq.

IN some remarks on certain of the specimens distributed last winter by the Botanical Society of London (See Phytol. ii. 766), I alluded to the close affinity between the two plants (I know not whether to say 'species' or 'varieties') above named; in illustration of which some examples of the *L. azorica* had been then recently distributed for comparison with our native *L. nemorum*. It was intimated that an explanation would be afterwards given in respect to the grounds for sending out specimens of an Azoric species in the parcels of British plants; which I propose to do here.

Independently of its bearing upon the distinctions of species for the objects of technical description, a very near affinity, without complete identity, between plants of distant islands, gives rise also to questions of much interest in connexion with vegetable geography and physiology. It bears intimately on the often vexed question of what is a

species and what is a variety, as distinguished or distinguishable by technical characters in books. And if not true species, why do the specimens collected in island A invariably present some peculiarities by which they can be separated from those collected in island B, by the eye of a person familiar with them, although technical language may not suffice to convey those peculiarities clearly to the minds of others? Does climate gradually bring about these differences; operating so slowly that many years or centuries of cultivation in island A are required, before the posterity of plants brought from B shall have thus far changed? Have these apparently two species had different origins, each under its own climatal conditions, and not been afterwards varied? But I might ask a score of unanswerable questions, or questions that cannot be answered under existing knowledge; and I will therefore prefer to state the circumstances, and leave others to ask queries of themselves, and reply thereto as they best can.

When in the islands of Fayal and Flores, in 1842, I found a species of *Lysimachia* in several places, which, while it presented considerable resemblance to our native *L. nemorum*, yet was sufficiently different in general appearance as to be then deemed a novel species by myself; and it is not often a fault with me to err on the side of "splitting" species. After returning to England I ascertained that the Azoric *Lysimachia* had been figured in the 'Botanical Magazine,' n. 3273, under name of *Lysimachia azorica* (*Hornem.*); although, as then appeared to me, rather inaccurately. Subsequently, in 1844, a 'Flora Azorica' was published by Seubert; and in this latter work the *Lysimachia azorica* was placed as a variety of the European *L. nemorum*, on the alleged ground of its indicated characters being too inconstant for specific diagnosis. Nevertheless, my own recollection of the plant, as seen in the Azore islands, the specimens brought thence and preserved in my herbarium, and living plants raised in England from their seeds, all appeared to forbid this union, or "lumping," of the two quasi-species.

I procured roots of the wild English *Lysimachia nemorum*, and kept them in cultivation under precisely the same conditions of soil and shelter, as I kept the plants raised from seeds of *L. azorica* collected in Fayal or Flores, and also other plants raised again from seeds of the latter ripened in England. Thus grown side by side, both in flower-pots and in the ground, the two apparent species preserved sufficiently obvious differences of general habit, to prevent any chance of mistaking one for the other, even on a cursory glance; and on closer inspection they yielded characters which would readily distin-

guish them by technical language in books. Moreover, the Azoric species proved decidedly more sensitive to frost than our native plant. Thus fortified by facts, or visible and describable distinctions, I retained the *Lysimachia azorica* as a genuine species in my own 'Catalogue of Azorean Plants,' published in the 'London Journal of Botany.'

Other facts, however, have more recently come under my observation, which throw considerable doubt on the propriety of my own course, while they also account for the opposite view taken up by Seubert, and explain the apparent inaccuracy of the figure in the 'Botanical Magazine.' In order to render the bearing of these latter facts intelligible, it may be necessary first to mention the distinctions observed between the plants of our native *L. nemorum* and those of my own *L. azorica*, as they appeared in the cultivated examples.

Lysimachia nemorum spreads closely over the ground, with lengthened stems and ramifications, which acquire frequently a purple tinge under exposure to the sun, and freely throw out young roots at their joints, by which they become tied to the earth, and draw fresh supplies of food or moisture for continuing their elongating growth. The leaves are opposite, that is, very rarely in whorls of three, and I have never seen them in four. The veins or nerves are impressed like channels on the upper surface of the leaves, which are rather acutely pointed, and of a darkish green colour. The sepals are very narrow, linear-lanceolate or almost subulate, and very acute. Other characters need not here be adverted to.

Lysimachia azorica, on the contrary, does not spread closely over the ground. Its stems and ramifications are procumbent at the base (except while young and short, when they are nearly erect) and then bend upwards in an ascending direction; throwing out few or no roots from those joints which do lie in contact with the ground, attaining much less of length, and remaining usually quite pale. The leaves are primarily opposite but frequently in whorls of three or four, pale green in colour, and obtuse; with their veins not channelled, but rather prominent. The sepals are comparatively broad, lanceolate-oblong or elliptic and obtuse. It was chiefly on the characters of a procumbent stem and elliptic obtuse sepals that I relied for a book distinction between the species.

After I had been thus watching the two quasi-species under cultivation, and comparing dried specimens, our Consul, Mr. Hunt, sent me some living shrubs from the island of St. Michael's, one of the Azore Group on which I had not landed, but in which the specimens seen by Dr. Seubert, author of 'Flora Azorica,' had been collected. The

shrubs had been dug up from native localities, and about their own roots came various bits of turf containing fresh roots of herbaceous plants destitute of leaves. These were carefully placed in pots, and they produced, among other things, a plant of the *Lysimachia*, which differed much from those previously in my possession; the differences bringing the Azoric species so far towards the British *L. nemorum*. The stems and branches of this example from St. Michael's were far longer, and more prostrate, than those of the plants raised from the seeds collected in Fayal; and they soon became fixed to the ground by roots thrown out from their joints. And on producing flowers, the sepals were found to have the narrow and acute form observed in *L. nemorum*. In short, in most respects the plant from St. Michael's stands as an intermediate form, or a connecting link, between the *L. nemorum* of Europe and my other examples of *L. azorica* from Fayal. Mr. Hunt likewise sent dried specimens from the island of St. Michael's; and most of these correspond with the living plant from the same island, although some of them do evince a tendency to assume the peculiarities of the Fayal plants.

The result is, that I am no longer able to write down any technical character by which *L. azorica* can be clearly distinguished from *L. nemorum*; and yet, whether living or dried, I can readily know one from the other when the examples are before me. I requested Mr. Dennes to send out, through the parcels from London, two specimens of *L. azorica*, as far as the number would allow, in order to show both forms, that with the narrow, and that with the broad sepals. On placing these by the side of *L. nemorum* the recipients will see the difficulty of distinguishing between them by written characters, while they may still be unable perfectly to match the *L. azorica* by any native examples of *L. nemorum*. It would, however, be highly desirable to find some British or European specimens intermediate, if such exist, between the ordinary *L. nemorum* and the St. Michael's form or variety of *L. azorica*, so as to complete the transition from the Fayal form into the British.

Taking the two forms of *L. azorica* together, they are distinguishable from the ordinary *L. nemorum* of Britain, by their less creeping stems; by leaves more obtuse, usually narrower, paler in colour, more rigid in consistence, more numerous and closer on the stems; by the sepals being rarely, if ever, quite so narrow; by greater susceptibility to frost. As yet, I have raised only the Fayal form from seed; and that, as before intimated, comes true and unchanged. When growing wild among other herbage, the *L. nemorum* of Britain does not throw

out roots so plentifully at the joints, as is the case with it when growing free in a garden ; but, except for this one circumstance, it is rather less like the *L. azorica* in its wild state ; being smaller, less leafy, and less rigid.

To sum up, in conclusion, we have the three forms under consideration :—*first*, the ordinary *L. nemorum* of Britain, with very narrow sepals and creeping stems ; *second*, the *L. azorica* of Flores and Fayal, distinguished by its broad sepals and procumbent stems ; *third*, the *L. azorica* of St. Michael's, a more robust plant than either of the other two, but intermediate between them in the form of its sepals and direction of the stem. Are they three varieties of one single species ? Are they three distinct species ? Are they two species ; the *L. azorica* comprising two well marked forms ?

It may be worthy of remark here, that several Azoric plants, to which I can only assign specific names as being identical with those of Europe, do nevertheless differ somewhat from our English representatives of the same species as they are presumed to be. For instance, *Fumaria capreolata* (*F. media* of Borgeau's Canary plants), *Raphanus Raphanistrum*, *Cakile maritima*, *Reseda Luteola*, *Viola odorata* (*V. maderensis* of Lowe), *Hedera Helix* (the "Irish Ivy" of gardeners), *Mentha Pulegium*, *Calamintha officinalis*, *Scrophularia Scorodonia*, *Antirrhinum Orontium*, *Xanthium Strumarium*, *Plantago lanceolata*, *Daphne Laureola*, *Bromus mollis*, *Polypodium vulgare*, &c.

H. C. WATSON.

Thames Ditton, September, 1847.

Researches in Embryology. By WILLIAM WILSON, Esq.

(Continued from page 914).

Viscum album.—On my first examination of this plant, several years ago, the result was so unsatisfactory (owing to the viscous structure of the ovulum, which seemed to render it impossible to trace the pollen-tubes to their destination) that I laid it aside as impracticable ; now, after recent and more successful attempts, my views are considerably altered, and I am led to consider *Viscum* to be peculiarly well adapted to explain the mode of the formation of the embryo.

Before I enter into details, it will be useful to refer to the various papers on the *Loranthææ*, by the late Mr. Griffith, read before the Linnean Society.

On the subject of *Viscum*, Mr. Griffith says "the modifications are two; in the one an evident cavity exists in the ovarium, and the ovulum appears to be reduced to an embryonary sac, hanging from the side of the base of a nipple-shaped or conical placenta; in the other the ovulum is reduced to an embryonary sac, but this is erect, and has no such obviously distinct point of origin as in the first. In both the albumen has no other proper covering than the incorporated embryonary sac; and, at least in the last, the embryo appears to be a direct transformation of the pollinic vesicle."

In *Santalum*, and also in *Osyris*, "the ovulum is reduced to a nucleus and an embryonary sac, prolonged beyond both the apex and base of the nucleus; the albumen and embryo are developed in the parts above the septum (in the exserted portion of the sac), the parts below and the nucleus remaining unchanged. The seed has no actual proper covering, and no other theoretical covering than the incorporated upper separable parts of the embryo sac."

In *Loranthus* "each ovulum appears to be reduced to an embryonary sac, the albumen is developed either partly within the sac, or entirely or almost entirely without it. The embryo is a growth from the ends of the continuations of the pollen-tubes outside the anterior ends of the embryo-sacs, and is in one modification (*L. globosus*) up to a certain period exterior even to the albumen. In *L. bicolor* the albumen has no proper tegument; in *L. globosus* it may be supposed to have a partial one in the incorporated albuminous part of the embryo-sac."

In his summary of the novel points of structure, &c., indicated in his paper, he mentions (*inter alia*) 1st. The longitudinal percursion of the embryo-sac by the pollen-tubes. 2nd. The formation of the albumen either only partially within the embryo-sac, or almost entirely, if not quite so, without it. 3rd. The confluence of the albumina of several sacks into one albumen. 4th. The growth of the embryonic tissues from the continuations of the pollen-tubes outside the embryo-sac. 5th. The possibility of one embryo-sac resulting from a combination of several pollen-tubes, and of its becoming anterior to the albumen, although it may have been for some time entirely exterior to it.

Now, it seems impossible to reconcile, in the same example, the first point with the fourth (which indeed appears to have been retracted as an error in the note of November 19, 1844); indeed, the general tendency of Mr. Griffith's remarks (if we except his fifth point) is to create the impression that he considered the embryo-sac to be

entirely distinct from the pollen-tube, and as forming an integral part of the ovulum previous to fecundation; all other parts being suppressed in *Loranthus* and in some species of *Viscum*. As I have not had the opportunity of examining any of the allied genera to which he refers, I must confine myself to *Viscum*, concerning which my own observations lead me to doubt whether the embryo-sac, properly so called, has any existence in the ovulum previous to fecundation. The second modification of *Viscum* specified by Mr. Griffith is that of *Viscum album*, which, in his view, has the ovulum reduced to an embryonary sac; and if we consider it in connexion with the third point ("the confluence of the albumina of several sacs into one albumen"), there arises a confusion of terms not very easy to be explained. Did Mr. Griffith suppose that in those cases where the seed contained more than one embryo there were originally the same number of "embryo-sacs," combined into one ovule previous to fecundation? or had he obtained a glimpse of those facts which I am about to state, but which his multifarious pursuits prevented him from distinctly perceiving? He appears to have attached much importance to the existence of the embryo-sac in the ovulum previous to fecundation; for, in his concluding note of November, 1844, he states that *Osyris* and *Santalum* have alike furnished evidence to prove "the non-existence of any cell or body of or in the embryo-sac, from which the embryo is derived, independent of the pollen-tube." His appended remark, that "the vesicle from which the embryo is to be derived does not appear to exist before the application of the pollen-tubes to the sac, it being in fact, so far as my means of observation enable me to go, the anterior extremity of the pollen-tube itself," tends to show that he had not obtained full demonstration on the main point of the inquiry, and on this point I trust that my own researches will now throw some further light.

It is well known that the seed of *Viscum album* usually contains two, and sometimes three embryos, and yet the ovulum consists of a single cavity. I consider that this is very improperly termed an embryo-sac; for, as such, it presents the strange anomaly of being external to the albumen, and also of receiving within it a plurality of embryos. At the very bottom of this cavity I find, some time after fecundation (July 1, 1847), the three fusiform bodies represented at fig. 8, their attenuated bases terminating in a single cellule, and not more firmly fixed to the base of the ovule than is the seta of any species of moss within the vaginula. In two instances I observed what seemed to be portions of pollen-tubes, continuous with the apex;

but this is a point which I am compelled to leave for future inquiry, having commenced my examination this year and in 1845 too late in the season. It seems highly probable that the pollen-tubes penetrate to the bottom of the ovule, and that their extremities become transformed into these fusiform bodies, and if so, it follows that neither the albumen nor the embryo-sac, properly so called, has any existence in the ovule until fecundation has been effected. I consider these fusiform bodies to be each a rudimentary mass of albumen, containing near its apex the true embryo-sac, with its included embryonary vesicle, as is evidently shown by their appearance at a subsequent stage (August 23). They are at this period enlarged, as represented at fig. 11 *e*, and not unfrequently one of the three is abortive. Such as are fertile now coalesce to form one body of albumen, which as yet only partially fills the cavity of the enlarged ovule, and the embryos (fig. 11 *g*) are still only half developed, with faint traces of cotyledons. At this period the viscous sarcocarp of the seed may be seen radiating in numerous faintly spiral threads, issuing from the surface of the veiny innermost integument of the future seed.

The introduction of pollen-tubes is a fact of too much importance to be admitted on any but the most incontrovertible evidence; though it will materially tend to remove doubt if the tubes can be traced, in this plant, even into the style; for the tissue of the stigma is more dense than that of the style, and lower down the cellules are so loose as to present no barrier to the progress of the tubes to the very base of the ovule (a distance of less than the twelfth part of an inch); but as yet I have not witnessed any penetration whatever below the surface of the stigma. It will be interesting to ascertain why the number of pollen-tubes admitted into each ovule is restricted to three. The union of two or more embryos in one seed seems to be a provision to secure the propagation of a plant, which being diœcious might otherwise become extinct. The fusiform bodies are evidently not separate ovules; for their attenuated bases have no resemblance in structure to funiculi, and have no vascular tissue; indeed, their connexion with any supposed placenta, except by mere contact of a cellule, is altogether problematical.

In *Viscum album* the ovule appears to be naked, as in *Juniperus*, and to consist of only one distinct membrane (the embryo-sac of Griffith), which afterwards becomes the veiny inner coat of the seed; but if the sarcocarp exists *ab initio*, it may be regarded as the primine, the veiny integument as the secundine, and the loose cellular tissue within it (which also serves the purpose of conducting stigmatic tissue,

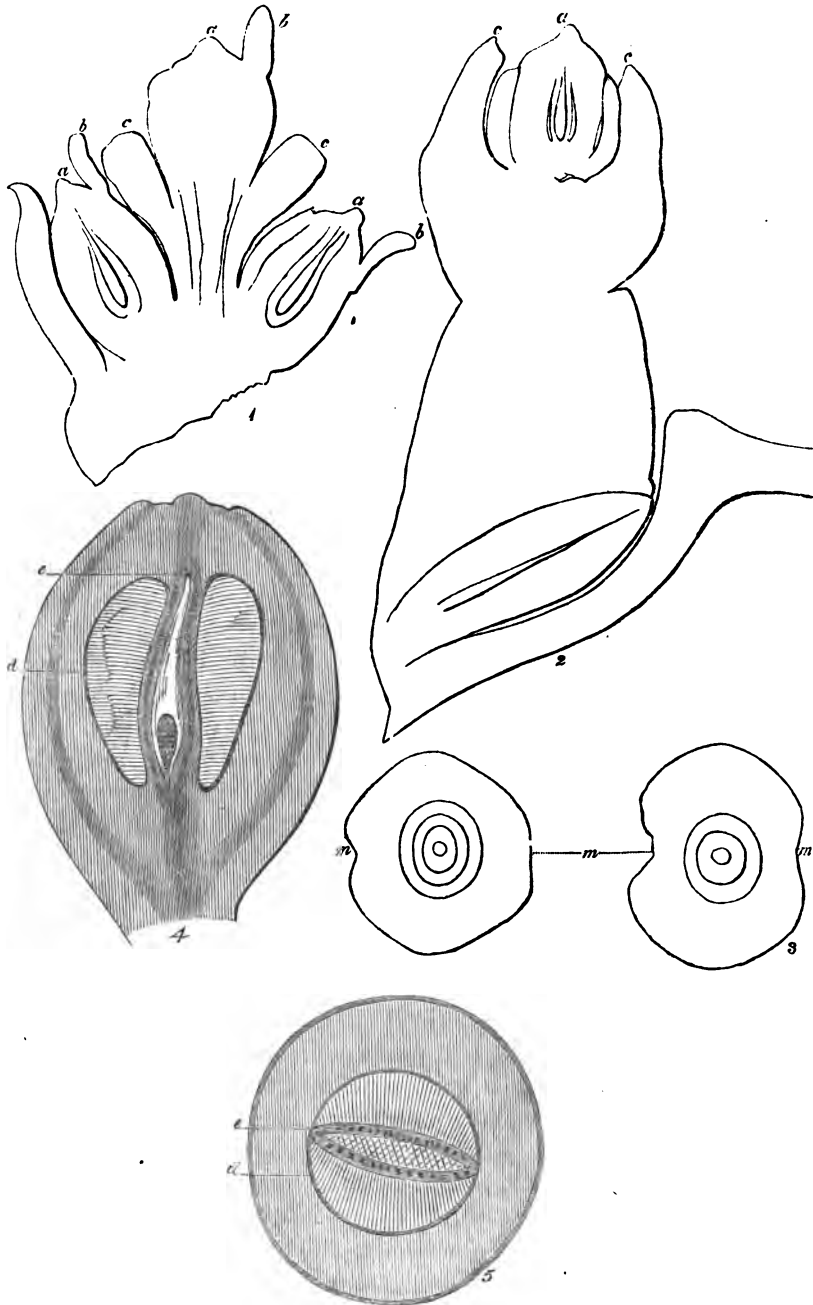
and is certainly a continuation of the style) is analogous to the nucleus. Fig. 1 represents a longitudinal section of the three flowers at the summit of a branch, ten times magnified (May 13, 1845). The section is taken at right angles to the direction of the pair of leaves below the flowers: *a*, stigma; *b*, one of the deciduous petals; *c*, portions of the diphyllous calyx of the central flower. Fig. 2 represents another section of the central flower (in the direction of the leaves), the petals having fallen away: *a*, stigma; *c*, calyx. The apparent central cavity of the ovule is exhibited somewhat larger than the reality, and it appears in the dried section now before me as a membranous sac within the nucleus, and may be what is usually considered as an embryo-sac; doubtless it is into this cavity that the pollen-tubes, if at all, are introduced. The two pale curved lines like lateral cavities may be the primine or future sarcocarp, not further distinguishable at this stage. The lower part of this figure shows the base of the leaf with an unexpanded leaf-bud in the axis. Fig. 3 is a transverse section of the central flower, the lateral ones (whose position is at *m, m*) having been removed; the outer broad ring represents the calyx, which forms no part of the ripe fruit, and is found unchanged at its base.

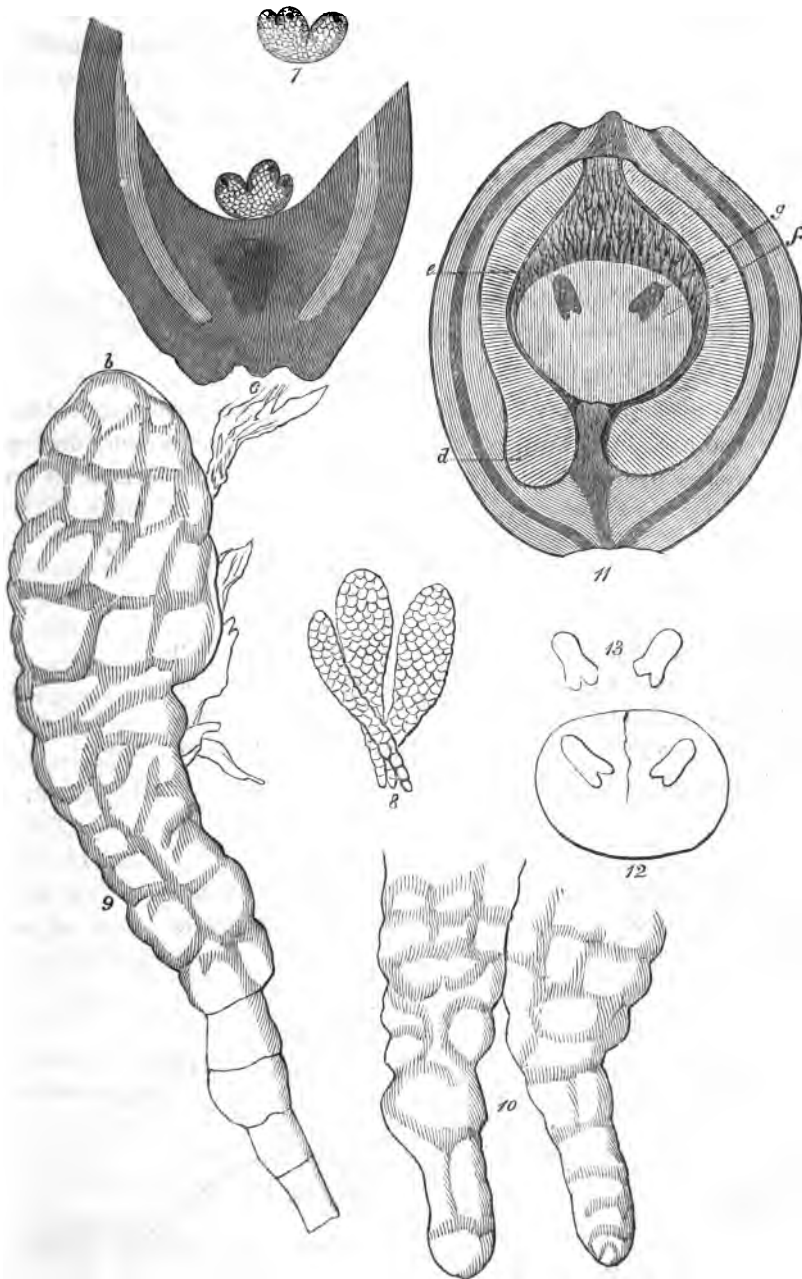
Fig. 4 is a longitudinal section, ten times magnified, of an advanced central ovule (July 9, 1845) in the direction of the leaves, showing the sarcocarp, *d*, and the veiny integument, *e*, within which is the nucleus, and, at the base, one of the three fusiform bodies from which the albumen and embryo are developed. Fig. 5 is a transverse section of a similar ovule, and fig. 6 a longitudinal section at right angles to the pair of leaves, showing the three fusiform bodies about to coalesce into one mass of albumen, the tapering bases being at this stage obliterated, as is seen at fig. 7, where three dark spots at the top indicate the position of the first traces of the embryos.

Fig. 8 shows the fusiform bodies at an earlier stage (July 1, 1847) in their original position, forty times magnified. Fig. 9, one of the three, 240 times magnified, with traces of a surrounding membrane at the apex: the base of this is mutilated. Fig. 10 shows the unbroken bases of the other two, equally magnified.

Fig. 11 represents the longitudinal section, ten times magnified, of an unripe fruit (August 23, 1847); *d*, sarcocarp; *e*, veiny integument; *f*, mass of albumen; *g*, one of two embryos, the third being absent by abortion. Fig. 12, albumen with the embryos, which are seen detached at fig. 13. All these figures are from actual dissections.

The results obtained appear to me to be the most interesting of any





which have arisen from these researches. A renewed examination of the flower at the proper season (April) may be expected to furnish more precise information, now that the economy of the plant is understood, than when the early part of this memoir was prepared.

W. WILSON.

Orford Mount, September 6, 1847.

List of a few Plants found in Bouldersdale and Teesdale, together with the Formations on which they were found. By DANIEL OLIVER, Esq.

IF the subjoined list of plants gathered by my companion, J. Allison, who has kindly assisted in forming the list, or myself, during late excursions in Bouldersdale and Teesdale, with the formations on which they were found, is worthy of insertion in the pages of the 'Phytologist,' it is at thy service.

On Basalt.

Potentilla fruticosa	Hieracium rigidum, &c.
———— alpestris	Asplenium viride
Sedum Telephium	Woodsia ilvensis
Saxifraga aizoides	Equisetum variegatum
Galium boreale	

On "Sugar-Limestone."

Thalictrum alpinum	Spergula stricta
Draba incana	Dryas octopetala
Helianthemum canum	Juncus triglumis

On Limestone.

Epilobium alpinum	Saxifraga Hirculus
Sedum villosum	Polystichum Lonchitis

On Marshy Ground, Substrata Basalt.

Bartsia alpina	Tofieldia palustris
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DANIEL OLIVER, *tertius*.

Benwell Fishery, Newcastle-upon-Tyne,

. 9 Mo. 22, 1847.

Notice of a 'Handbook of Field Botany, comprising the Flowering Plants and Ferns indigenous to the British Isles. By WM. E. STEELE, A.B., M.B., Trinity College, Dublin, Licentiate of the King's and Queen's College of Physicians; Corresponding Member of the Botanical Society of London; Lecturer on Botany in the Richmond Hospital School of Medicine and Surgery.' Dublin: M'Glashan, 1847.

WE can scarcely imagine that the most remote probability of success attends the publication of a descriptive list of British plants in opposition to the established works of Hooker and Babington; but we have no wish on this account to prejudice the work before us, and therefore request the reader's attention to the author's own introduction.

"In preparing the following pages for publication, I have been desirous to supply the student with a guide to the floral productions of the British Isles, which, according to the principles of the natural system, should embrace all that might be found necessary to enable him to identify species with ease and certainty.

"The present advanced and advancing state of botanical science in these countries renders it unnecessary for me to defend the adoption of the system of natural orders, as the basis of a work like the present, in preference to that of Linnæus; the public voice has now decided this question; so that the advocate for the Linnæan system, in place of being an effective assailant, is now compelled to act on the defence.

"The very simple and superficial nature of the inquiries necessary to be instituted in assigning to any plant its class and order in the system of the great Swede, is the chief, if not the only, reason that can be urged to justify the continued use of that arrangement. It must be borne in mind, however, that the investigation does not end with this; for in order to determine the genus of which the plant is a species in the heterogeneous assemblage thus brought together, other and frequently most minute points of structure must be inquired into, surrounding this phase of the investigation with considerable difficulties. In the natural system these difficulties are merely transferred to the determination of the natural order; but this once accomplished, that of the genus is comparatively simple. So far, then, it is apparent that the difficulties in the application of either system, to the determination of genera, are nearly balanced. If, however, we can simplify the investigation by which we can assign a plant to its natural order, then the only plea against the condemnation of that of

Linnæus is removed, and we are justified in venerating it, merely as the beautiful structure of a past age, but which is altogether unsuited to the requirements of a more enlightened generation.

"It is, however, by junior students that the difficulties which oppose the application of a Flora, to the practical pursuit of botany, constructed on a system so diffuse as that of Natural Orders are chiefly felt; and hence, in the endeavour to render that system available to young botanists, it is necessary not only to arrange the orders in a clear and judicious method, but to make that arrangement dependent not on those strictly essential characters which are frequently so minute as to require the aid of the dissecting-knife and microscope to investigate, but on others more easily determined, yet of a less ordinal value. In the present work I have attempted to carry out these views, and have therefore given analytical tables of the orders, genera and species, constructed on characters so practical, as, I have reason to believe, may lead even the most inexperienced to the identification of any plant. Many botanists, from early associations and long habit, prefer employing the Linnæan arrangement; for these an analysis of the genera according to that system is also prepared.

"The method of using this book is, therefore, as follows: an unknown plant is submitted to examination; it is first tested by the characters given in the analytical table of the natural orders, in order to discover to which of them it belongs. That found, the student is to turn to the page indicated by the number affixed to the ordinal name; he there finds the order, with its description,—the essential or diagnostic characters, taken in connexion with the heading of the page, being printed in italics—and with which he finds the plant under examination to agree. That natural order embraces an assemblage of genera, arranged in a table similar to that of the natural orders; and by a like process, the genus to which the plant is referrible is determined, the accuracy of which may be verified by comparing it with the generic description immediately preceding the arrangement of the species. In a similar manner, the specific denomination is discovered, observing, however, that respecting the species their analyses and descriptions are incorporated. If, in the course of the examination, the meaning of a word is required, the student is referred to the glossary; and should the case need it, he may find the form illustrated by a figure in the frontispiece.

"Having now obtained the specific and generic name of the plant, to which order, division, sub-class, and class the plant belongs, on looking at the symbols under the name of the species, he learns its

duration, time of flowering, colour, in which of the three kingdoms alone the plant has been discovered, if it have not been found in all, or if it be exclusively a native of the Isles of Jersey, Guernsey, &c., as indicated by the letter C.; and finally, by the last figure on the right hand, whether it be a plant of rare or frequent occurrence."—*Introduction*, iii.

The analytical method of determining the station and name of an unknown plant, originated, as our readers are probably aware, with the great French naturalist, Lamarck; and with various modifications has since been successfully employed by De Candolle, Hooker, Lindley, and other botanists both in this country and on the continent. It has especially been applied to British plants by Dr. Lindley* and by Mr. Ralfs.† Thus it is evident that the idea of the analytical method did not originate with our author, who does not indeed lay claim to it, neither does he acknowledge the labours of predecessors in this particular mode of investigation. Analytical tables of this description, if properly prepared and carefully used, are of the greatest use even to the practised botanist; on the other hand, as Dr. Lindley has well observed, this method "is of all the very worst if used injudiciously:" for "one false step, either on the part of the author who frames it, or on that of the reader, instantly leads astray, and induces errors of the most serious kind." The truth of these remarks we have frequently had occasion to notice, while superintending the studies of others.

Several cases of oversight occur in Mr. Steele's analytical table of orders, which would not a little puzzle the tyro: among others may be mentioned his calling the Plantaginæ "Water plants," and Haloragæ "Land plants." Now, so far as the British Flora is concerned, the species of Haloragaceous genera (*Myriophyllum* and *Hippuris*) are eminently water plants; and *Littorella*, the only British genus of the Plantaginæ which can be said to contain *water* plants, does so accidentally rather than normally, since its only species, though located on the margins of pools and lakes, and in other localities liable to be inundated, where it will grow luxuriantly even when covered with water, yet it never flowers until the retiring of the water has left it exposed to the influence of the atmosphere.

Then again with regard to the Dioscoriaceæ and the Trilliaceæ, the calyx of the former is said to be "petaloid," and the petals of the latter "brightly coloured;" a tyro would scarcely refer *Tamus*, with its inconspicuous herbaceous perianth, to the former, nor *Paris*, with

* Synopsis of the British Flora.

† Analysis of the British Flora.

its green herbaceous petals, to the latter; notwithstanding the conspicuous coloured petals of the exotic genus, *Trillium*, belonging to the same order. And this leads to some remarks upon the author's notions of a *natural* system as set forth in this volume.

Entertaining the idea "that the principles of vegetable transformation or morphology might be made available in the formation of the higher divisions of flowering plants," he thus proceeds to explain his views as to the applicability of this doctrine to the arrangement of plants in a natural manner.

"To effect these metamorphoses, it is apparent that some special vital forces are called into action; and we are justified in the inference, that those flowers which exhibit the most extensive departures from the original type, as the result of a more intense action of those forces, ought to be regarded as possessing a higher structural nature than those wherein the primitive model may be more evidently traced. It is manifest then, that the most simple metamorphosis the leaves undergo is in the production of flowers, all the parts of which most nearly resemble the former in being distinct from one another; and that when these separate parts appear in a new condition, by their cohering more or less intimately with each other, a more complete alteration is effected. Therefore it is, I conceive, that flowers whose parts thus cohere, are to be considered as possessing a more exalted structure than those in which the several floral whorls and the members of each are distinct.

"In the construction of a system for the arrangement of flowering plants according to these views, the following principle may be enunciated:—*That plants whose flowers exhibit their several parts in a state of separation, are to be placed in a lower position than those in which their several parts are in a state of cohesion*; and on this principle, the table of natural orders immediately preceding the descriptions is constructed."—p. vi.

In carrying out these views the author first divides the Exogens into three groups—Diclinous, Hypogynous and Perigynous; thus apparently suppressing the epigynous orders, though in reality merging the perigyns of other botanists in the hypogynous orders, and giving the name of perigynous to the epigyns proper. To this arrangement we cannot subscribe. We are of opinion that no mode of division can be more natural than that applied to the Exogens by Lindley in his 'Vegetable Kingdom,' where they are primarily broken up into two groups, the one *diclinous*, in which the flowers are absolutely unisexual; and the other *hermaphrodite*, or possessing both stamens and

pistils in the same flower. Of these two primary groups, the Diclines are undivided; to this we shall have occasion to allude again presently: the hermaphrodite group being broken up into three subclasses, hypogynous, perigynous, and epigynous. Curiously enough, this arrangement affords additional support to that applied by Mr. Newman to the animal kingdom, which he claims to be considered as *the System of Nature*, and to which allusion has before been made in our pages (Phytol. ii. 711). In every mode of arrangement claiming to be natural, the same principles must be applicable to all the kingdoms of nature—to plants as well as animals: and Professor Lindley has unconsciously afforded the means of testing the system as applied by Mr. Newman to the latter, by his most matured plan for arranging the former.

In the first place, according to the principles of the System above alluded to—*Every natural group should divide obviously into four*. This condition is well fulfilled by the class of Exogens as now divided in accordance with certain peculiarities connected with the organs of reproduction. These four groups are:—

1. *Diclinous*, including those plants in which the flowers are typically unisexual, without any customary tendency to hermaphroditism.
2. *Hypogynous*, including such plants as have the stamens entirely free from both calyx and corolla; the flowers being typically hermaphrodite and the ovary free.
3. *Perigynous*, in which the stamens are adherent to either the calyx or corolla, and the flowers typically hermaphrodite, with the ovary free or nearly so.
4. *Epigynous*, with the stamens, floral envelopes and ovary combined, the latter being inferior or adherent in consequence, and the flowers typically hermaphrodite.

Thus is the first condition fulfilled by the Exogens; the second requires that *One of these four groups shall contain representatives of the other three*. The first, or *diclinous* subclass of the Exogens meets this demand; for, as Lindley says, "It would be possible to break up the diclinous alliances into Hypogynous, Perigynous, and Epigynous clusters." This might indeed be readily effected, although it would not be possible to retain the alliances intact as they now stand, since some of them include plants belonging to each of the minor divisions—they must consequently be "broken up." It would occupy too much of our space to show at present how this may be effected; we can only intimate the possibility of doing it.

In addition to the three groups thus indicated, there is however a fourth, superior to all the others, and whose limits "are in no degree invaded." This group seems to consist of the single alliance Quernales. Its truly diclinous flowers, its seeds composed of a large amygdaloid embryo without albumen, as well as the peculiar venation of the foliage, afford genuine marks of recognition and keep it distinct from all the groups to which it is most nearly allied. In it, the perfection of exogenous structure is undeniably most perfectly displayed. The exalbuminous seeds with their very large embryo are indicative of a power of independent self support, well borne out by the prolonged existence of the long-enduring oaks, which are its typical members.

This, then, is the group which, from its superiority, its entirety, and its peculiarities, is entitled to hold the central place in the System of Nature as applied to the vegetable kingdom, in the same way as the Primates do among animals. The Quernales being placed in the centre, the hypogynous, perigynous and epigynous Diclines naturally range themselves around them, and as naturally lead to the typical hypogynous, perigynous and epigynous Exogens, and these in their turn to the external groups by transitions which at some future time we shall endeavour to illustrate; but for the present we must content ourselves with merely sketching a faint outline of what we conceive to be a natural mode of grouping plants, and proceed at once to mention the dichotomous divisions of the three last-named groups.

Externally to the Primates among animals, which, as we have just said, are represented by the Diclines among plants, we find three groups of Mammalia comprising the remainder of the placental animals. Two of these are in themselves double or dichotomous, and the third consists of two equivalent groups; thus fulfilling another condition, which requires that while the central group shall be entire and incapable of equal dichotomous division, *the other three groups shall either be obviously double or dichotomous, or else made up of two corresponding equivalent groups*. Now, the hypogynous, perigynous and epigynous groups are each capable of being dichotomously divided into two minor groups, analogous to the Cheiroptera and Glires, the Bruta and Belluæ, and the Cete and Feræ of the placental animals. Thus, one of the minor groups of hypogyns would include such plants as make up the Malval and Sapindal alliances, as examples of the other may be mentioned the Berberal alliance; in perigyns, one division would include the Gentianals, Solanals, Rosals, &c., the other the Rhamnals, Daphnals, &c.; and in the epigyns, one

group would include the Asarals and their allies, and the other the Umbellals, &c.

Beyond these lie three other double groups, which, while they are *essentially* exogenous in their structure, yet do they exhibit such modifications and peculiarities as warrant us in viewing them in the light of transition or connecting links between the Exogens proper and the outermost groups of the system. These transition groups are:—

1. *Dictyogens*, divisible into two groups; one containing the Dioscoriaceæ, the other the Trilliaceæ, with their allied plants respectively. This group is analogous, in position at least, to that formed by the marsupials and birds combined.
2. *Gymnogens*, divisible into acrogenous and exogenous, the former including the Cycadaceæ, the latter the Taxaceæ, and collectively analogous to the double group of reptiles.
3. *Rhizogens*, divisible into mycelious and thallous, the former including Rafflesiaceæ, the latter Balanophoraceæ, and collectively analogous to the double group of fishes.

With these three groups, Dictyogens, Gymnogens, and Rhizogens, the exogenous orders terminate; in the same way as the Vertebrata are completed by the birds, reptiles and fishes.

Beyond the Dictyogens, and connected by them with the Exogens proper, is the double group of Endogens, divisible into complete and incomplete, the former including the Palmals, as exhibiting the perfection of exogenous structure, and the latter the Glumals: thus, in its twofold composition being analogous to the Articulata of the animal kingdom, divided into the Pterota and Aptera.

Beyond the Gymnogens, which connect them with the Exogens proper, lies the double group of Acrogens, divisible into those with distinct spiral vessels, including the Filices, and those in which spiral vessels are less distinct, or altogether absent, including the Musci, Equiseta, &c. This group is analogous to the Mollusca among animals, divided into Vermes annelida and Vermes mollusca.

Beyond the Rhizogens, by which they are connected with the Exogens proper, is the double group of Thallogens, divisible into the mycelious and thallous, the former including the Fungals, the latter the Lichenals and Algals. This group is analogous to the Radiata, divided into the Radiata echinodermata and Radiata zoophyta. And it is at this point that the animal and vegetable kingdoms may be said to coalesce, by means of those anomalous beings with respect to whose position in either kingdoms naturalists are as yet by no means agreed.

The above imperfect attempt to establish a correspondence between the groupings of the two kingdoms, claims no merit on the ground of originality; its materials are drawn from a work of which British botanists may well be proud, and the idea of arrangement is borrowed from Mr. Newman's 'System of Nature.' The unforced coincidences between the two kingdoms, are, to say the least, most curious, and can scarcely be the effect of chance; but the idea requires to be more elaborately worked out in its minor details, before the proposed arrangement can be placed upon a firm footing. This elaboration, even should it prove the fallacy of the idea, will doubtless amply reward the inquirer by the discovery of numerous unexpected affinities and hidden combinations which will prove of value in future investigations.

This digression has led us far away from the professed object of our notice, and from another particular connected therewith, to wit, Mr. Steele's division of his perigynous and hypogynous Exogens into what he terms Synpetalæ and Apopetalæ; the former comprising the monopetalous plants of other botanists, the latter both the polypetalous and apetalous. In accordance with the principle quoted at p. 990, he assigns to the Synpetalæ a higher position than the Apopetalæ; but this is opposed to the views of the soundest botanists, by whom a plant is justly considered to be so much the more elevated in the order of development, in proportion as it exhibits fewer suppressions and combinations of parts, and more numerous multiplications: and further, in the words of Dr. Lindley, "Whatever points of structure are variable in the same species, or in species nearly allied to each other, or in neighbouring genera, are unessential to the vital functions, and should be set aside, or be regarded as of comparative unimportance. Hence the badness of the Monopetalous, Polypetalous, and Apetalous divisions of Jussieu, depending upon the mere presence or absence, and union or disunion, of petals. The genus *Fuchsia*, for example, has petals highly developed; but in *F. excorticata* they are absent, and yet the plant differs no otherwise from the rest of the genus: the same is true of species of *Rhamnus*. Again, the rue has the petals separate; and *Correa*, very nearly allied to it, has them combined."—*V. K., Introduction*, xxviii.

*Remarks on the Radiant-flowered Variety of Centaurea nigra or
"C. nigrescens."* By EDWIN LEES, Esq., F.L.S.

MR. ROBY, a gentleman known in the literary world as the author of 'Traditions of Lancashire,' and several volumes of Travels, and who adds botany to his varied accomplishments, has been staying at Malvern this summer, and took the opportunity of running over and examining the localities of the plants recorded in my 'Malvern Botany.' This he has done in the best spirit of his kindly nature, and it is a pleasure to be thus "revised and corrected." Having called my attention to a radiant-flowered *Centaurea*, which he considered as *C. Jacea*, and on which Mr. Newman, in a late number of the 'Phytologist' (Phytol. ii. 924), has, I see, suggested some queries for more certain decision; perhaps on my own ground I may, without presumption, offer an opinion.

The specimens in question grow on a grass plot at Great Malvern, near the chalybeate pool, in great profusion and luxuriance, intermixed with the undoubted *C. nigra*. Having gathered a sufficient number, I give the result of my examination. Whatever the continental *C. Jacea* may be, the question here only concerns, I apprehend, the plant so called by Sir J. E. Smith. On reference to the fountain-head in this respect, the plant of Eng. Bot. t. 1678, it is evident that if that plate is implicitly to be depended on, the Malvern plant at all events is *not C. Jacea* of Smith. In that plate *C. Jacea* is represented with *few* calyx scales, all torn or only toothed, *not ciliated*; while in *C. nigra*, and in our radiant-flowered form, they *are numerous, all* the lower ones *ciliated*, the upper *only* torn. This, if proved constant, appears to be a good distinction, and indeed Smith relies entirely upon it, thus remarking, in E. B., under *C. Jacea*, "Mr. Borrer's specimens agree precisely with the Swedish ones of Linnæus, and differ from *C. nigra* in having much narrower and sharper leaves (the radical ones being toothed and sometimes laciniated) and radiant flowers; more especially in the calyx-leaves being pale brown, membranous and shining; the uppermost rounded at the top and almost entire; the rest with a thin, whitish, jagged, pinnatifid margin, *totally different* from the black fringed scales of *C. nigra*." Again, in E. B., under *C. nigra*, he says, "The true Linnæan *C. Jacea*, found in Sweden, is *essentially different* in having the calyx-scales much paler, membranous, laciniated, but *not ciliated*, and the flowers radiated." It is also stated with respect to *C. Jacea* by other botanists, that there is *no pappus* to the seed; but as it is also stated by Smith with re-

gard to *C. nigra*, "seed without any down;" and *C. nigrescens* is also said by Babington to have the "pappus almost wanting," it would seem that no reliance can be placed upon this character. The Malvern plants, radiant and non-radiant, appear all to have a *very short* but in many instances scarcely perceivable seed-down. However, looking to the *calyx* of Smith's plant, as our specimens are quite different in that respect, until further is known on that point, so insisted upon by Smith, they cannot be properly considered as *C. Jacea*.

The question would now be limited to *C. nigra* and *nigrescens*, if it can be truly understood what the latter is; but on the closest examination of Babington and other writers, I find nothing is produced that will stand the test of examination, but the flowers being *radiant* in *nigrescens*, and all hermaphrodite in *nigra*. "Flowers without a radius," says Smith, as a part of the specific character of *nigra* in E. B.; but then in the Eng. Flora he says, "Ray describes a double variety shown him by Thomas Willisel, in which the proper florets of the disk were all changed to handsome radiant ones." Now in what respect was this plant different from the modern *C. nigrescens*?

I find in the 'Flora Gallica' of Loiseleur Deslongchamps (1828), the following attempt to discriminate the three alleged species of *Centaurea* now under review.

"*C. Jacea*.—*C. caule erecto ramoso angulato, foliis lanceolato-oblongis, radicalibus subdentatis, squamis involucris interioribus scariosis, exterioribus apice serrato-ciliatis, pappo nullo, seminibus margine brevissimo coronatis.*

"*β. foliis lanceolato-oblongis integerrimis.*

"*γ. foliis lanceolato-linearibus, inferioribus sinuato-dentatis.*

"*C. nigra*.—*C. caule erecto ramoso angulato, foliis lanceolatis dentatis, squamis involucris scariosis apice serrato-ciliatis, flosculis omnibus æqualibus hermaphroditis, seminibus pappo piloso brevissimo-coronatis.*

"*C. nigrescens*.—*C. foliis radicalibus obsoletè pinnatifidis, inferioribus basi subdentatis, superioribus indivisis integerrimis, involucris ciliatis, squamulis intimis scariosis.*"

It must be admitted here that although there is a varied display of words, nothing palpable appears worthy of discrimination, except the "pappo nullo" of *C. Jacea*, and the "flosculis omnibus æqualibus hermaphroditis" of *C. nigra*. Now if, as shown by Ray, and admitted by modern botanists, the florets of *C. nigra* are not always hermaphrodite, what difference remains to distinguish *nigrescens*

from *nigra*? There would really appear to be none. We see in the above citation the terms of description of the calyx-scales are only slightly varied, and in fact I cannot discover in the Malvern radiated and non-radiated plants any difference whatever in the ciliation of the scales; all the lower ones are ciliated, the upper ones more or less torn. Attention is indeed called under *nigrescens* more particularly to the foliage, and it would thus appear by leaving out any notice of radical leaves under *C. nigra*, as if *nigrescens* had a peculiarity in having its radical leaves obsoletely pinnatifid, its middle ones only subdentate, and its upper ones entire. But this is a mere delusion; for the very same thing is observable in the true hermaphrodite *nigra*, of which Smith remarks in *Eng. Flora*, "Lower leaves somewhat lyrate, partly stalked, finely toothed, upper sessile, either partly toothed near the base, or quite entire." So under *C. Jacea* the French author denotes a variety with radical leaves sinuato-dentate. In fact, on collecting a series of radical leaves from both the radiant and non-radiant plants at Malvern, I found it impossible to draw up any satisfactory description that would without exception apply to either of them as different from the other. The radiant seemed in general to have the broader leaves with less elongated foot-stalks, but then in other specimens they would be quite as narrow as those of *C. nigra*, and a deeply cut or sinuato-dentate leaf would appear close beside an ovate and only subdentate one. The middle leaves, however, I found in both to be most frequently pinnatifid, and the upper ones *always* narrow, entire and sessile; none even in *nigra* so broad as shown in *Eng. Bot.* t. 278. With regard to the alleged darker aspect of the foliage in *C. nigra* I must confess that I could in this respect perceive very little difference between the radiant and non-radiant forms, though the specious and elegant external florets of the former gave quite a garden aspect to its flowers, which was of course not the case with the dense, compact heads of *nigra*; but there was no difference whatever in the colour of the scales.

I think, then, that while the character of the scales of the calyx in *C. Jacea*, and their permanency of aspect requires to be looked into from an examination of Sussex and continental specimens; that *C. nigrescens* has no character sufficiently important to separate it from *nigra*, and that it must stand as a variety of that species, while probably the β . of *nigra* with radiant flowers is in reality the same thing.

I must state, in conclusion, however, that I have never found a ra-

diant flower in these plants on the same stem with an hermaphrodite, nor *vice versa*, so that the variety may be permanent in that respect.

EDWIN LEES.

Cedar Terrace, Henwick, Worcester,
October 1st, 1847.

Fritillaria Meleagris and Lotus angustissimus in Hampshire.

By WILLIAM A. BROMFIELD, M.D., F.L.S.

THE former of these additions to the Flora of this county was imparted to me through Miss Louisa Minchin, as growing plentifully in a moist meadow adjoining the Winchester road, just before entering Bishop's Waltham, where it has been known for many years past, ingress being now I understand denied by the owner, Mr. Jonas, in consequence of the injury done to the land by persons digging up the bulbs for transplanting into their gardens, and from a laudable desire to preserve the plant from extirpation. The *Fritillaria* grows also in a similar meadow near the river at Droxford, a few miles from the other station, where it is less distributed, and I believe more abundant. I have seen a specimen from the Bishop's Waltham locality in the herbarium of Miss S. Lovell, of Sandown, Isle of Wight, from whom my information is derived. In this lady's collection are two good specimens of *Lotus angustissimus*, from Stokes Bay, Gosport, likewise gathered by Miss Minchin, who is about to favour me with a list of plants found by herself in this and other parts of the county, which, if received before the following remarks are forwarded for publication, may possibly enable me to announce some new accessions to the Hants Flora at their conclusion.

WM. A. BROMFIELD.

Eastmount, Ryde, Isle of Wight,
September 26, 1847.

Note on a Hampshire Flora. By WM. A. BROMFIELD, M.D., F.L.S.

No county perhaps in England has been less explored botanically than Hampshire, or has fewer working botanists resident within its pale, yet the number of its phænogamous plants and ferns already ascertained amounts to very nearly, if not fully, 1000

species, those of the Isle of Wight of course included. Many more I am persuaded lurk undetected on the varied surface of the mainland (by far the most extensive and least examined) section of the county, and I heartily wish our travelling botanists would direct their attention to this most fertile and promising part of the south of England. One entirely novel species, *Simethis bicolor*, has very recently been discovered at Bournemouth, which, from its range extending in France to the opposite coasts of the Channel, may equally prove to be indigenous on this side of it. But not from the transient researches of botanical tourists must we look for a complete Flora of Hampshire, nor is any individual, however active and zealous, competent to engage, single-handed, in the task of efficiently exploring so wide an area. Partiality for my native county prompts the expression of a wish that some of its indwellers would emulate the example of that earliest of Hampshire botanists, honest John Goodyer of worthy memory, in examining and reporting on the plants of their respective neighbourhoods. May it be no longer a reproach to the county which gave birth to Gilbert White, that it is at least *not amongst the foremost* in animating others with the same ardour for the study of Nature as was displayed by him whom it may be so justly proud of calling its own. A better example has been set in this respect to the east and west of us by the contiguous counties of Sussex, Surrey and Dorset, all of which have produced their botanical historians, from whose zeal and ability have emanated valuable contributions to the science in the form of local lists and Floras. The few additions to the common stock of botanical information which Hampshire can lay claim to have mostly proceeded from the pens of strangers and temporary residents.

In proof of the position that little has yet been done for the elucidation of the Hants Flora, I subjoin a list of fifty-two genera, which, so far as I can learn, are wanting (or I should rather say are unknown) to the county, several of which must nevertheless, from the universality of their distribution in the neighbouring counties, really appertain to this.

<i>Aceras</i>	<i>Arnoseris</i>
<i>Acorus</i>	<i>Asperugo</i>
<i>Actinocarpus</i>	<i>Blysmus</i>
<i>Amaranthus</i>	<i>Buxus</i>
<i>Andromeda</i>	<i>Cicendia</i>
<i>Apera</i>	<i>Cicuta</i>
<i>Aristolochia</i>	<i>Corrigiola</i>

<i>Corynephorus</i>	<i>Limosella</i>
<i>Cynodon</i>	<i>Lycopodium</i>
<i>Dentaria</i>	<i>Mespilas</i>
<i>Digitaria</i>	<i>Muscari</i>
<i>Diotis</i> ?	<i>Parnassia</i> ?
<i>Doronicum</i>	<i>Petasites</i>
<i>Elatine</i>	<i>Pilularia</i>
<i>Gagea</i>	<i>Polycarpon</i>
<i>Herniaria</i> ?	<i>Pyrola</i>
<i>Hottonia</i>	<i>Sanguisorba</i>
<i>Hydrocharis</i>	<i>Sesleria</i> ?
<i>Hymenophyllum</i>	<i>Setaria</i>
<i>Iberis</i>	<i>Sibthorpia</i>
<i>Impatiens</i>	<i>Sturmia</i>
<i>Knappia</i>	<i>Tillea</i>
<i>Leersia</i> .	<i>Tordylium</i>
<i>Leucojum</i>	<i>Trinia</i>
<i>Libanotis</i>	<i>Villarsia</i>
<i>Lilium</i> ?*	<i>Xanthium</i> ?

Of these fifty-two genera, twenty-nine are printed in italics, from their occurrence or prevalence in adjoining counties, and those followed by a ? denote their having been recorded as found in Hants, but are either now extinct, or rest on authority too ancient, or questionable and unconfirmed. *Sesleria* is here introduced because, though hitherto supposed to be confined to limestone districts in the north of England, it is known to occur on dry chalk banks at Rouen, and may possibly be found with us in a similar situation, when the fact is kept in remembrance by collectors, who might otherwise overlook what they had no reason to expect falling in with; a common cause why even conspicuous plants often remain so long undetected. This very truth must plead an excuse for troubling the readers of the 'Phytologist' with observations so purely negative as the present; the end I have in view will be better attained by engaging their attention to the discovery of our botanical *desiderata*, than in diverting it from the search by presenting them with a more palatable catalogue of *ascertained* county plants to pick and choose from, to fill vacant shelves in their herbariums. The adage, "out of sight out of mind," would, I fear, be exemplified by the continuance in obscurity and concealment of most of my desiderated species, were I not to bring

* Said to be *undoubtedly wild* in woods near Bishop's Waltham.

them thus prominently and exclusively forward by name before those to whom I confidently look for assistance in their detection.

The following *species* belonging to Hampshire genera should be looked for in the county, since there is reasonable probability of any one of them being native therein, though yet unrecorded.

<i>Alchemilla vulgaris</i>	<i>Habenaria albida</i>
<i>Althæa hirsuta</i>	<i>Hypochæris glabra</i>
<i>Anemone Pulsatilla</i>	<i>Hypericum dubium</i>
<i>Barkhausia foetida</i>	———— <i>maculatum</i>
<i>Brachypodium pinnatum</i>	<i>Lactuca saligna</i>
<i>Carex clandestina</i>	<i>Lathyrus Aphaca</i>
———— <i>dioica</i>	———— <i>palustris</i>
———— <i>depauperata</i>	<i>Lepidium latifolium</i>
———— <i>digitata</i>	<i>Lithospermum purpureo-cæruleum</i>
———— <i>elongata</i>	<i>Lonicera Caprifolium</i>
———— <i>filiformis</i>	———— <i>Xylosteum</i>
———— <i>limosa</i>	<i>Medicago falcata</i>
———— <i>montana</i>	———— <i>minima</i>
———— <i>striata</i>	<i>Nasturtium sylvestre</i>
———— <i>tomentosa</i>	———— <i>amphibium</i>
———— <i>vesicaria</i>	<i>Orchis hircina</i>
<i>Caucalis daucoides</i>	———— <i>militaris</i>
<i>Chenopodium ficifolium</i>	<i>Ornithogalum pyrenaicum</i>
———— <i>hybridum</i>	———— <i>nutans</i>
<i>Chrysosplenium alternifolium</i>	<i>Orobanche caryophyllacea</i>
<i>Crepis paludosa</i>	———— <i>elator</i>
<i>Cynoglossum sylvaticum</i>	<i>Phleum asperum</i>
<i>Cyperus fuscus</i>	———— <i>Böhmeri</i>
<i>Diplotaxis muralis</i>	<i>Phyteuma spicatum</i>
<i>Dianthus deltoides</i>	<i>Pimpinella magna</i>
<i>Eleocharis caespitosa</i>	<i>Poa bulbosa</i>
<i>Equisetum hyemale</i>	<i>Polygonum dumetorum</i>
<i>Erica ciliaris</i>	———— <i>laxum</i>
<i>Eriophorum gracile</i>	<i>Polypodium Dryopteris</i>
<i>Erodium moschatum</i>	———— <i>Phegopteris</i>
<i>Erysimum cheiranthoides</i>	<i>Polypogon littoralis</i>
<i>Fedia carinata</i>	<i>Potamogeton perfoliatus</i>
<i>Fumaria parviflora</i>	With probably several others
<i>Galeopsis versicolor</i>	<i>Potentilla argentea</i>
<i>Galium Parisiense</i>	———— <i>verna</i>
<i>Gentiana Pneumonanthe</i>	

Rhynchospora fusca

Rumex maritimus—— *palustris*

Salix Helix

—— purpurea

—— rubra, &c.

Salvia pratensis

Scirpus carinatus—— *triqueter*

Scleranthus perennis

Scrophularia Erharti—— *vernalis*

Senecio sarracenicus

—— viscosus

Silene conica

—— *noctiflora* ?

Sisymbrium Sophia

Stellaria glauca

Teucrium Scordium

Thalictrum minus

Trifolium maritimum

Utricularia intermedia

Veronica spicata

—— triphyllos

—— verna

Vicia bithynica

—— hybrida

—— *lævigata*—— *lutea**Villarsia nymphæoides*

Xanthium strumarium ?

A perusal of the foregoing lists will, I think, demonstrate the neglect the Flora of Hampshire has experienced as compared with those of the other south-eastern counties, since in all these last a fair proportion of the genera and species just enumerated have been found, some of them abundantly, and others by no means sparingly distributed. The central, southern and eastern districts have received the greater share of the limited attention bestowed on the county; the north and north-western part is nearly an untrodden field for the botanical explorer, and merits particular investigation, as likely to produce some of the species proper to Berkshire and Oxfordshire, as *Iberis amara* and others, though much remains to be discovered in all quarters. Even whilst penning these remarks, I have made an addition to the Flora of this pretty well perambulated island in *Polygonum minus*, which grows in profusion on Sandown Level, mixed with and in a great measure masked from observation by the taller *P. Hydro-piper*; the drains intersecting the low meadows to the east of the high road from Ryde to Ventnor being conspicuous at a distance by a fringe of the richest colouring, the joint production of the exuberant growth of these two species. *Alyssum calycinum* has very recently been discovered growing abundantly on a fallow field behind Alverstoke, along with *Camelina sativa*, by Miss L. Minchin, from whom I have a specimen of the former, which is most probably introduced with grass or other seeds; the presence of the latter, which I have not received an example of, is curious, as I believe it is seldom seen but

where flax is cultivated, at least in this country; for on the continent it occurs in similar localities with the one just mentioned.

Before leaving England last year, I learnt that a Flora of Winchester was in preparation by some botanists of that city: I trust the intention is not given up, as the materials must be ample, but should such be unfortunately the case, it is to be hoped the authors of the projected work will embody the result of their researches in the compendious form of a catalogue for the 'Phytologist' rather than withhold them altogether from those to whom, like myself, their publication would be useful. It is my intention to include, though not to incorporate, the Flora of the entire county of Hants in that of the Isle of Wight, the materials for which are in a very forward state for the press. To all who will lend a hand, whether directly by communication with myself, or indirectly through the medium of this journal, to advance our knowledge of Hampshire Botany, I shall hold myself personally indebted, and more especially so to such as may be pleased to favour me by the transmission of living or dried specimens of any plants contained in the lists of genera and species given above.

WM. ARNOLD BROMFIELD.

Eastmount, Ryde, Isle of Wight,
October 2nd, 1847.

Note on Leersia oryzoides. By WM. A. BROMFIELD, M.D., F.L.S.

TRANSPLANTED from the marsh ditches of Henfield to a pond in the garden at St. John's, near Ryde, this singular grass shows no disposition to the protrusion of its panicles from the sheaths of the topmost leaves, favoured as one might suppose the development would have been by the general warmth of the past season. Hence it may perhaps be safely assumed to have been overlooked in many other stations in which it will ere long be discovered. The ordinary aspect of the herbage, so like that of other marsh grasses, has little to attract the notice of a casual passer by, and might well elude the scrutinizing glance of an experienced collector. Careful search should therefore be made along the grassy margins of ditches, drains, ponds, rivers, and water courses, as also in wet hollows over our eastern and south-eastern counties, in which alone it is likely to occur, when the extreme asperity of the leaves and of the weak reclining or even decumbent culms, cannot fail to detect it. I have a strong impression of having myself once found the *Leersia* many years ago, probably (from an in-

distinct recollection of the *time*, and a no less misty reminiscence of the *place*) near Hastings, that being my first residence on returning from a four years' sojourn on the continent, in 1830, when I first turned my attention to botany. The neglecting to examine so curious a "*find*," if ever *found* at all, shows that it must have been made in the most inexperienced days of my (botanically speaking) juvenility: so I will not venture to dispute the discovery with my very worthy friend Mr. Borrer, but cheerfully "leave him alone in his glory" to enjoy the satisfaction of adding this to the many other "wild weeds" he has wreathed into chaplets for the brow of our rustic Flora. This grass ranges over the whole of southern and central Europe to the Baltic confines of Germany, and though most prevalent in the deeply continental and warmer parts, is found in the maritime and western countries of France, Belgium, and Holland. In America I remarked it as one of the commonest of grasses in low wet situations, flowering in the central states as early as July or August: there, the panicle is constantly exserted as in Italy, a portion at the base always remaining, I believe, hidden, and which alone it is said ripens seed. My friend the Rev. Dr. Bachman, of Charleston, tells me that *Leersia oryzoides* furnishes excellent hay, and that many tons are sent from Columbia and other parts of the middle and upper country of Carolina to that city, where it is preferred to the hay made with timothy (*Phleum pratense*), a staple meadow grass all over America. As the cut grass is now known to be a native of England, its growth might be advantageously encouraged or artificially established in swampy pastures or along the ditches of water meadows, where it would in all likelihood prove to be both permanent and productive.

WM. ARNOLD BROMFIELD.

Eastmount, Ryde, Isle of Wight,
September 26th, 1847.

Note on Sisyrinchium anceps. By WM. A. BROMFIELD, M.D., F.L.S.

IN the second edition of his valuable 'Manual of British Botany,' Mr. Babington introduces the pretty "blue-eyed grass" of America (*Sisyrinchium anceps*) as a native of Ireland, without any mark attached to indicate a doubt in his mind of its claim to be so considered. Were I not assured that so cautious and correct a botanist must have good reason for believing a plant foreign to the European flora to be indigenous in its alleged place of growth, I should feel very sceptical on the propriety of admitting it, at least without some such

protest. The vegetation of Ireland betrays no greater affinity to that of North America than the flora of England or any other country of western Europe, and the discovery of a single American species so far beyond its usual limits, is powerless to establish the supposed transition state on which to found its right to be looked upon as indigenous. *Sisyrinchium anceps* is an abundant inhabitant of grassy woods and pastures from New England to Louisiana: its bright blue flowers peering out like laughing eyes on the green world and azure heavens, justify the poetical name it has received in the land of the setting sun. *S. anceps*, *mucronatum*, and *Bermudianum* would seem to be all referrible to a single species, and my friend Dr. Darlington, of West Chester, remarks (*Fl. Cestrica*) that in his Pennsylvanian plant the spathe is decidedly shorter than the flowers, as Mr. Babington finds it in that from Ireland.

WM. ARNOLD BROMFIELD.

Eastmount, Ryde, Isle of Wight,
September 26th, 1847.

On the Credit-worthiness of the Labels distributed from the Botanical Society of London. By HEWETT C. WATSON, Esq.

IN a late Number of the 'Phytologist' some allusion is made to the state of botanical nomenclature among British botanists at the period when this periodical commenced its useful career. A part of the passage on the subject runs as follows:—"The two Botanical Societies at that time distributed plants with equal inattention to correct nomenclature, so that blunders became disseminated through the country under the grave and pompous sanction of scientific authority. Indeed, the blundering of Societies may have exercised an influence in increasing the blundering of writers. As regards Societies, however, a great improvement has taken place, and great care is now taken to see that the plants distributed are correctly named." (*Phytol.* ii. 782).

This censure is sufficiently sweeping, it must be allowed. But I fear it must also be allowed, that the censure is substantially true and justifiable; some modifications being made, in order to adapt it more exactly to the individualities of two different Societies, which have run in different courses. Originally, the nomenclature on the labels of the Edinburgh Society was far less inaccurate and blundering than that of the London Society. But while the latter has been improving very rapidly, the Edinburgh Society has been standing still or retro-

grading in attention to nomenclature as well as in too many other respects also. Whatever may have been the relative position of the two Societies some years ago, that of London has since most assuredly left the other far behind in carrying out the purposes for which they were understood to be originally instituted.

The appearance of the censure quoted in the above passage from the 'Phytologist,' has not lessened a wish which I had long since felt, of making public record of some circumstances which might assist botanists in forming a proper estimate of the degree of trust or distrust to be given to the labels issued with specimens from the Botanical Society of London. This institution may now be deemed the grand centre from which the herbaria of British botanists are supplied with such specimens as the individual possessors or collectors of herbaria cannot readily procure for themselves. Among upwards of two hundred members we now find many of the most active field collectors and best practical botanists of Britain. Their duplicate specimens are sent to London as a central dépôt, whence they are again promptly distributed among the individual members in England and foreign botanists, according to the requirements of each. Many thousands of labelled specimens are thus distributed from London each year, in the name of the Society. Much influence, whether for good or for mischief, must thus be exercised over those departments of botanical science in which accuracy of nomenclature is an essential matter; for example, among others, in the publication of local lists, or of special localities for plants.

Of the London Society's doings during the few first years of its instituted existence, say from 1836 to 1840, I know very little; although enabled to form legitimate guesses or inferences thereanent, from circumstances which have subsequently come within my knowledge. Under a mistaken idea that sufficient reliance might be placed upon the good faith and public pledges of those who were assuming the management of the Botanical Society of Edinburgh, I became an early member of that Society; while the association of a few tyros, under the pretending title of "Botanical Society of London," appeared to presage only an abortive effort and short existence. Subsequently, however, I was induced to join the London Society also; although at first only with the design of assisting its objects by one additional subscription, and without any thought of actively interfering in the management.

But as it soon became too evident that the Edinburgh Society would not be worked for the general benefit of its members, and would

more and more be converted into a mere instrument for promoting the personal interests of two or three individuals, I saw that some other institution must manage the machinery for producing those more general and less selfish services which had been first expected from the Edinburgh Society. My conviction was, that the scheme of an association for the mutual exchange of specimens, which had long been a desideratum with several botanists, would certainly prove futile unless the London Society could be raised from its obscurity and uselessness, and be rendered generally serviceable to those who might become members, whether resident or non-resident, present or distant. The botanical inexperience of its then active managers, and the childish character of its management, were serious impediments, it is true. But I saw among the resident members a spirit of integrity and goodwill towards others,—a wish to render the institution equally serviceable to others as to themselves; and on that moral superiority in the London Society I relied for its ultimate success, if a sufficient share of botanical experience could be united therewith.

Under this conviction, and with this hope, I began to take some share in the management of the London Society, though very little at first. But the more I looked into its proceedings, the more imperfect and inefficient they appeared to be, both in plan and in execution. The correction of one erroneous course or method, for a time, appeared only to give prominence to another almost as bad; and the necessity of changes for the better seemed to be ever recurring. A continued endeavour to introduce better methods, and of giving something like scientific precision to the doings of the Society, has thus been gradually leading me on, until I now find myself so much implicated that a very large portion of the actual work and responsibility now falls upon my own head and hands. Indeed, I may question whether the earnest and indefatigable Secretary himself, whose disinterested exertions have conduced so much to the Society's efficiency, is called upon to devote more time and attention to its affairs. And I feel quite sure that he need not devote more, if he would rest satisfied with doing what is really needful, without letting his zeal force him upon the attempt to do more than is necessary from him. The manner in which these circumstances have influenced the Society's distribution of specimens, and affected the accuracy of its labels, will presently appear.

In the earlier years of the Society's existence, it was customary to have an annual distribution by dividing among its contributors such specimens as had been received in the year or season, some imperfect arrangements being made for selecting the desiderata of the members,

if the chances of the year's receipts should afford the species desired. This simple and easily managed system was too much of a lottery and chance-method; for a member might obtain much that he did not want, with little or nothing that he did want, in return for his contribution. It was a system which might work passably well among mere beginners in botany, and was thus not badly adapted to those of whom the association then chiefly consisted. But the circumstance of contributors and distributors being both mostly beginners, unavoidably led to serious mischief by the circulation of numerous misnamed specimens, the labels of which bore the "pompous sanction of scientific authority," implied in the pretending title imprinted thereon, namely, "Botanical Society of London," or some supposed equivalent in the latin language.

I think it was in the winter of 1840-1841 that I was asked to look over a large batch of these accumulated specimens, after they had been labelled, and also sorted into order for distribution, by the Committee appointed for the purpose. At that time I was not well prepared for examining nomenclature, my attention having been diverted to other subjects than botany during the preceding few years. However, the re-examination was so evidently needed that I consented to look through the lot, including probably a thousand species, and five or ten times as many specimens, the greater portion being examples of common English plants. Among the lot I found upwards of eighty species misnamed; and as the misnomers of course were multiplied by the duplicate specimens, they really included several hundreds of false labels. Besides this, I had too much reason to suspect that, in many instances, the localities indicated on the labels deserved as little reliance as the names.

Such being the character of the Society's nomenclature in the fifth year of its experience, we may fairly presume that the distributions of former years could not have been more accurate and trustworthy in that respect; and, indeed, the labels of specimens preserved in the herbarium, with other visible evidences, left me no room for doubt of such being the fact during previous years. The late Mr. Daniel Cooper had been much relied upon for nomenclature and general management. He was certainly an intelligent and active-minded young man; but he had unfortunately imagined himself already competent to guide and instruct others before he had sufficiently acquired knowledge as a learner.

It was thus made very obvious to me, that the labels of the London Society would obtain no trust or credit in the botanical world, and

could do no service in the way of correcting nomenclature, unless they could be rendered far more accurate in future; and also some mode be found and announced, by which a distinction could be made between the then past and the then future labels,—between those which partook so largely of error, and those which I hoped to see more deserving of trust thenceforward. On the labels used up to 1841, the words “Ex herbario Bot. Soc. London,” or “Botanical Society of London,” were printed conspicuously at the top of the label, above the blank space left for the name of the plant;—a stupid idea, by the by, apparently borrowed from the Edinburgh Society. I suggested that in future those words should always be placed at the bottom of the labels, so as to let the names of the plants be the first words to meet the eye, and thus facilitate the sorting and arranging of specimens; a second advantage being likewise obtained thereby, in the ready distinction which would thus be afforded between past and future labels.

But as one important step towards rendering any after-dated labels more trustworthy, it was necessary to abolish altogether a most vicious custom previously acted upon to a large extent. I allude to the inane practice of sending any quantity of blank labels, bearing the Society's printed designation, to be used by the individual members in labelling their own specimens. No distinction appeared to have been made between the experienced and the inexperienced botanists, in this practice; the labels having been promiscuously and lavishly supplied to those who asked for them. There could be little doubt that many specimens, so labelled with the Society's printed forms, would be distributed by the individual members without ever passing under the eyes of the Committee in London. The Society's name was placed at the command of any inexperienced tyro who filled up the labels with the names of his specimens, and what the writer in the ‘Phytologist’ calls “the pompous sanction of scientific authority” might in truth be no more than the slender knowledge of the veriest beginner in botany.

The Secretary readily acquiesced in my earnest recommendations to cease this absurd and mischievous practice of supplying the Society's blank forms to individual members. But it is much easier for a man of obliging disposition to promise a refusal beforehand, than to make such refusal at the right time. I had afterwards the vexation of discovering that the blank forms were still sent out after my remonstrance; and in one or more instances this was done, I think, even so late as 1848. Meantime, I had been taking considerable

pains to make the labels more accurate, and to keep within reach the means of correcting such errors as might still be put into circulation from Bedford Street. But of course my own efforts were greatly frustrated and stultified by the continuance of a practice so much to be reprobated. Nor was this the only instance in which those efforts were rendered of little avail. I have no doubt that many mislabelled specimens were also distributed from Bedford Street between the years 1840 and 1844. Thus, whether the words "Botanical Society of London" be found at the top or at the bottom of the label, is a difference of comparatively little importance. Adherence to a very bad precedent has vitiated all the Society's labels up to 1843; possibly likewise to a later date, since some of the blank forms may have remained on hand, and have been filled up and distributed still more recently, without first reaching London.

After these glaring examples, it seems needless to cite in detail other instances of inattention to accuracy, or of injudicious practices calculated to damage the Society's name, and to detract greatly from the usefulness which might otherwise, and much earlier, have characterized its proceedings. Suffice it to say that, previous to 1841, the errors put into botanical circulation, under sanction of the Society's name, appear to have been gigantically numerous, with scarcely any compensating advantage from its doings. From 1841 to 1844, I must deem myself a participator in the proceedings and responsibilities of the Society. But during much of that period I could only feel myself continually engaged in a vexing struggle against a deficiency of scientific accuracy, an inattention to orderly arrangements, and a lack of methodical management, which would assuredly have driven me from the London Society, had there appeared any reasonable likelihood of the Edinburgh Society redeeming its pledges, or treating its non-residents with even-handed justice. The want of order and precision in the Bedford Street management was too usually carried the length of downright disorderliness and slovenly confusion; while the state of dust and dirt in which the rooms and cabinets were suffered to remain, rendered it quite disagreeable to do anything in them.

It is true, a verbal and ostensible acquiescence was given to various remedial ameliorations which from time to time I suggested. But too frequently I found these rendered profitless through being neglected in practice; or that the anticipated advantages were nullified by some ill-judged act which served to counteract the effect desired from them. It was even more vexatious to find my own efforts thus impeded or neutralized, while there really was an ample store of the best possible

intentions, with much anxiety and exertion for promoting the Society's objects and interests, on the part of those same persons who were nevertheless so impeding and neutralizing mine, simply through their own insufficient apprehension of the true requisites for scientific progress. They were doing good service, adulterated with disservice, at the same time; and conscious of the former, but unconscious of the latter, they doubtless deemed my remonstrances and grumblings highly unreasonable. Nevertheless, although much might have been better done, and it would have been much better if other things had not been done at all, there really was some onward progress and improvement between 1840 and 1844. The Society gained useful members; experiments were tried, which, though unsuccessful at the time, led the way to better measures; and I make no doubt that, on the whole, the number of mislabelled specimens was proportionally much less.

From 1844, inclusively, the London Society has advanced with rapid and safe progress in that one branch of its operations which I have myself always considered to be in truth more like the main stem, although various other objects are or were ostensibly embraced in its projected ramifications. It will readily be surmised that I am here alluding to the operations of the Society regarded as an institution for mutual interchange of specimens;—for bringing into one convenient centre, and re-distributing thence the products of various localities and countries;—for diffusing through Britain a large number of carefully labelled specimens, and thus conveying instruction to isolated or provincial botanists, whose opportunities for examining authentic specimens in other herbaria may be few and far between. This function of the Society appears to me a highly important and useful one. For any other purpose than this one, I fear that the Botanical Society of London can only be deemed valueless at present. True, the same zeal and perseverance of a few individuals, which has planned and gradually worked out the distributing system to its present state of practical efficiency, may be extended into other departments also. But an almost insuperable bar to anything like general efficiency, is found in the slender finances of the Society. After payment of rent and other local and fixed expenses, nothing remains to offer as a remuneration for skilled and competent labour; which is a marketable commodity not often to be got without payment. Services which are offered for nothing, too often are found to be worth very little; and those which can be bought for little, are likely to prove worth nothing at all:

Without explaining all the steps of the process, and the various expedients for facilitating the troublesome labour of distribution on so large a scale, it may still be advisable for me to advert briefly to the present routine, in order to give botanists the means of judging for themselves how far they may *now* safely trust the labels sent to them from the Botanical Society of London. Our rule is, for the contributor himself to label the British specimens which he transmits in duplicate to London for distribution. As the parcels are received they are deposited in a large box in Bedford Street, which in due time is despatched to me here, at Ditton, filled with the parcels. My first work is to take out all the specimens from the various parcels, and remove them to paper of one uniform size; this preliminary step being indispensable for the after sorting and arranging, by which they would be much chipped and broken, if turned about upon sheets of unequal size. Any specimens which may be required for the Society's herbarium, or for any other special purpose, are then selected; and (as may be shrewdly guessed) I take the same opportunity of attending to the wants of "No. 1;" but these being much less numerous than the contributions made to the Society by said "No. 1," the abstractions are more than repaid. The specimens are afterwards sorted out and arranged, so as to bring all those of the same species together, and to place the whole in the same order of succession or sequence as that in which their names are printed and numbered in the 'London Catalogue of British Plants.' In the course of sorting and so on, various changes and corrections of name have usually to be made; fresh labels being written for such specimens as may have been incorrectly named, or for others sent un-labelled by botanists who are not members, and therefore not amenable to the rules. Invariably, hitherto, numerous specimens have required to be taken out and destroyed, or else returned to the member who sent them; being insufficient fragments, or very badly dried, or too long for the paper, or labelled contrary to rule, or objectionable in some other sort. Ultimately, the rest are again boxed, and returned to London, where the ever-working Secretary (in the want of a Curator) introduces them, species by species, into their proper places among the general store of duplicates for distribution; and from which he selects the desiderata of members, with such additional help as he may be fortunate enough to obtain from other resident members in town.

From these explanations, although not very full or complete, it will be understood that the labels of British specimens, distributed latterly (during about three or four years) from the London Society,

have usually passed under three pairs of botanical eyes. The labels are penned by the original contributor, who is often also the collector of the specimens, and thus sufficiently familiar with them. They have likely passed unchallenged under my own eyes in the processes of sorting and arranging, &c. And they again pass under the inspection of Mr. Dennes, or may be some other individual, when he takes out the specimens in London, in order to supply the desiderata of members. Usually there are numerous specimens of the same species, and when this is the case I do not read each label singly; nor perhaps does Mr. Dennes always read the labels in selecting specimens from the general store of duplicates; so that there may be particular instances where a label has been really seen and examined only by the original sender. And on the other hand, when fresh labels are written, in order to change the nomenclature, the original contributor ceases to be responsible for their accuracy. In certain genera, also, where the limits and distinctions of species remain unsettled, we should not change the labels, although our individual opinions might not concur with that of the contributor who had attached his own labels to the specimens; say, for example, in the genus *Rubus*, where we should never change the labels of Mr. Bloxam. These, and some other special instances would be the exceptions; for, in general, the labels will have had the treble sanction. But I need scarcely observe that, in passing thousands of specimens through hand, often with considerable rapidity, oversights will be committed, labels will occasionally be crossed or misapplied, and other sources of error may arise.

There is one particular form of label, among several which have been used for British plants, that I will take the present opportunity of explaining. Some years ago, there was a large accumulation of specimens with loose labels, which had been mixed and confused together in such manner as to render the correct appropriation of the labels to the specimens quite impossible. They were known to be British specimens, and that was all that could be said of many of them in the way of indicating their habitats. For these specimens, many of which were sent abroad, we had a very general form of label printed, simply indicating that they had come from the Society's duplicates of British plants. The same general form of label has been also used occasionally for specimens which have been sent to the Society without labels, by botanists who are not members. I mention them here by way of intimation to those who might suppose that the Society was unmindful of its own rule which directs contributors to

specify the county and locality on their labels. I may also mention here, that some would-be-thought botanists are guilty of the reprehensible practice of mingling specimens and loose labels from different and even distant localities; by which means it may frequently happen that a label specifying one locality, becomes attached to a specimen really brought from a different locality. Very serious errors or falsifications have arisen through this and similar bad practices, especially where two species have been mixed and mistaken one for the other. One lady-botanist, of well-known name, has done this to a great extent; and thus has thrown into circulation numerous errors, some of which have appeared in print also.

As to the Botanical Society's foreign specimens, I am very sorry to say, almost the whole work of exchange and distribution falls to my lot, and sadly troublesome and time-stealing I find it to be. Most heartily do I wish that other botanist, in and near London, would relieve me from this heavy tax on time; which requires an union, in the same party, of ample leisure and a considerable familiarity with the Botany of various countries. As numerous specimens come from different and distant parts of the world, often only partially labelled or wholly unlabelled, the head-work in making out the species, and the hand-work in labelling them when made out, are both great consumers of time, too great indeed, for accuracy and completeness; besides all the other work of sorting, arranging, selecting, packing, &c., &c. Here, then, "the pompous sanction of scientific authority," under the sounding designation "Botanical Society of London," is in truth often only the hurried opinion of the individual member who subscribes the present paper. To sum up in conclusion, we should distinguish three periods of the Society's existence, in which the degree of trust or distrust, attaching to the labels and specimens has been shown to vary. First, those distributed previous to 1841 having been largely mingled with error, are to be distrusted. Second, from 1841 to 1844, although the probability of correctness is considerably increased, there was still a want of sufficient care and exactness; so that, in cases of doubt, the labels are to be received with caution or suspicion. Third, from 1844 to the present time, much more attention has been bestowed upon the labels towards insuring correctness of name and locality; and the arrangements in general have been such as to combine accuracy and facility to a degree which has probably not been attained elsewhere. Accuracy and tardiness, or quickness and incorrectness, are combinations not difficult to make. But where specimens are annually received in thou-

sands and tens of thousands, and have to be again divided among two or three hundred botanists, according to the individual wants of each, it is truly a difficult achievement to write with sufficient rapidity with sufficient accuracy; especially where this has to be accomplished by the unpaid exertions of very few persons, who have also their own professional or other absorbing avocations to occupy great part of their time and thoughts. Carefully planned arrangements, methodical precision, and uniformity strictly enforced, are the keys of success. And if our valued Secretary would always take these keys with him to Bedford Street, bright in use, when he goes to perform the duties of Curator there, all might go on well and smoothly: unluckily the keys sometimes become very rusty.

I am sorry to add, however, that there is one serious difficulty, which may be formidable enough to throw back all into confusion again. The difficulty springs from inattention and negligence on the part of country contributors. Certain rules are very explicitly laid down for their guidance in selecting and labelling their specimens. If these rules were strictly attended to by all, it would give great facility to the task of sorting and arranging; and the rules themselves are simple and easy of observance. But one member neglects one rule; another neglects a second rule; another neglects a third rule, and so on. When their parcels eventually meet in London or Ditton, instead of that uniformity and exactness which would be so serviceable, all is variety and confusion; the labour of arrangement being thereby doubled and trebled. So serious is the evil, that unless the approaching winter shall bring a very decided change for the better, in regard to the observance of fixed rules, I shall feel compelled to relieve myself from effort and responsibility for the future. I cannot afford the additional sacrifice of time caused by this inattention to the prescribed regulations; and truly I know not who else can and will afford it.

HEWETT C. WATSON.

Thames Ditton, October, 1847.

SURREY NATURAL HISTORY SOCIETY.

THE Rev. W. W. Spicer exhibited specimens of *Juncus diffusus*, *Hoppe*, gathered by him in company with W. Borrer, Esq., on a heath between Guildford and Woking railway station. The plant was in great plenty, intermixed with *Juncus glaucus*. Mr. J. D. Salmon

change with any botanical friend to whom it may be acceptable. The larger plants were growing in a beautifully radiating or stellated manner, and with their cernuous capsules spreading on every side, presented an object exceedingly pretty.

A. CROALL.

Ardersier, Inverness-shire,
October 23, 1847.

On the Viola flavicornis of Smith and others; in reply to Mr. Forster. By HEWETT C. WATSON, Esq.

In the 'Phytologist' for October (Phytol. ii. 963), Mr. Forster has denied the correctness of certain opinions which I had elsewhere set forth, to the effect that a wrong plant has been figured in the 'Supplement to English Botany,' plate 2736, under his sanction, for the *Viola flavicornis* of Smith; the true plant of Smith, as I understand it, being a different thing (whether a good species or the contrary), and properly represented by a plant which I have distributed from the heaths and commons of Surrey, labelled with the name of *V. flavicornis*.

Since reading Mr. Forster's paper I have again examined the specimens in Smith's herbarium, labelled "*flavicornis*" by himself, but only with the same result as before. I still find myself unable to adopt the views of Mr. Forster; who, be it observed, gives no fact or reason beyond his faith in his own eyes, for contradicting my opinions. No doubt that highly respected botanist is well entitled to prefer the evidence of his own sense of sight before that of another person. But since he and I literally have had the same facts under our observation, and have yet formed different opinions therefrom, it is clear that some more reasoning argument must be found in substantiation, than the words of Mr. Forster, "I now boldly venture to assert," which can be received only as the expression of a confident opinion, and not as any argument towards proof of its soundness.

The differences between us are rather complicated and confusing, because they involve four separate things, all of which have in turn been expressed by the name of "*Viola flavicornis*." I will first distinguish the four things here, and temporarily employ other names to designate three of them, as the most likely way for avoiding that bias of judgment and confusion of ideas, so likely to arise where several things are called by one single name before they have been proved

are pectinately pinnatifid, though smaller than in the plant above named, which has *all* its bracts of this description.

There does not appear to be any character in *M. pectinatum* sufficient to separate it from *M. verticillatum* as a *species*, but it is certainly a remarkable-looking variety.

W. L. NOTCUTT.

Fakenham, October 5, 1847.

BOTANICAL SOCIETY OF LONDON.

Friday, October 1, 1847.—Dr. P. B. Ayres in the chair.

Donations of British plants were announced from Professor Henslow, Dr. Mateer, Dr. Wood, Mr. H. Fordham, Mr. J. Hussey, Mr. D. Oliver, the Rev. C. A. Johns, Mr. J. Lynam, Mr. S. Hailstone, Mr. G. S. Gibson, Mr. James Ward, and Mr. T. Moore.

Specimens of *Zostera nana* (*Roth*), collected at Poole Harbour in August last, by Mr. Borrer, were presented by Mr. Sowerby.—*G. E. D.*

Note on Bartramidula Wilsoni of Bruch and Schimper.

By ALEXANDER CROALL, Esq.

PERHAPS it may be interesting to the readers of the 'Phytologist' to know the exact locality of this beautiful and interesting little plant, in order that they may keep a look out for it, should any of them happen to visit the same or a similar locality. To those who have visited Clova, the birch-trees at the head of Glen Dole, where flowers and fruits in great profusion the lovely *Linnæa borealis* and *Hypnum crista-castrensis*, will be quite familiar. Here the Glen is shut up by the shoulder of a hill—Craig Lunkar, on one side of which the White Water pours down over its wild and rocky channel, on the other is a sloping hollow occupied by a small stream and leading over to Loch Esk. It is the shoulder above described on which grew the *Bartramidula*, in such profusion as to cover almost the whole of it, under this restriction that it only extended over those parts, the surface of which had been recently burned.

The plants were mostly single but sometimes tufted, and such was the singular beauty of the tiny plant, that I could not resist the temptation of picking some two hundred specimens, although I had not then studied the mosses, and have still a few specimens to ex-

flavicornis. The leaves of this latter plant (Smith's species) are described as being "obtuse minutely crenate," and the flowers are said to be "half the size of *V. canina*, of a rather deeper blue." Now the leaves of Forster's violet are represented as quite acute and sharply crenate or rather serrate, the flowers large and with the purple tint of *V. canina*. Moreover, Mr. Forster states that his violet is the same as Babington's variety "pusilla," which is thus described in the Manual: "leaves roundish-cordate rather acute small, flowers large." Further, Mr. Forster is at variance with Smith in another respect, while writing for the 'Phytologist,' that "The two figures in E. B. and the figure in Dillenius's edition of Ray's Synopsis, well represent the specimen preserved in Smith's own herbarium." According to my sight, the figures in 'English Botany' are not good representations of Smith's specimens, but are passably good figures of the "dwarf violet;" and as to the figure of Dillenius, Smith himself writes that "his figure by no means represents the true nature of the stem, nor does it exhibit any of the parts most material for specific discrimination." Add thereto, that Babington places "Forster's violet" as the first variety of *Viola canina*; intending, I presume, that it is the one which differs least from the ordinary or typical form; whereas Smith describes his flavicornis as a distinct species, and places another species (recognized as such by Babington) between it and *V. canina*; thus showing that he intends something considerably different. Putting these differences and difficulties together, I think they should be deemed more weighty in their aggregate, than the mere assertion of Mr. Forster, that his violet and Smith's flavicornis are not different. I shall add something more to their weight in endeavouring to show that another plant, the "Surrey violet," is the true flavicornis of Smith.

Secondly, I am confirmed in my reasons for believing Mr. Forster under a misapprehension about Smith's plant, by finding two plants in Surrey (two well marked varieties, if not absolutely different species), one of which, "the Surrey violet," corresponds well with Smith's own description of his flavicornis, and also (to my eyes, at least) with the specimens in his herbarium; while the other, "the dwarf violet," corresponds with the figures and description of "Forster's violet," before cited. The former of these two, "the Surrey violet," agrees with the plant of Smith precisely in those characters by which Forster's violet differs. It has the smaller and more blue flowers, with the obtuse leaves; and it further agrees with Smith's plant in the rigid or coriaceous consistence of its leaves. It is also a persistent variety

under cultivation, as Smith remarks of his plant. But Mr. Forster states that this "Surrey violet" is not Smith's *flavicornis*. I am here entitled to ask of him, in my turn, *by what characters does it differ?* I have mentioned points in which his violet differs from that of Smith,—can he shew those by which the Surrey violet differs to an equal degree?—or to any describable degree?

Thirdly, if I were assured that Mr. Forster and Mr. Babington deny the identity which I see between the "dwarf violet" and "Forster's violet," I should say that I so regard them as being identical because the figure in 'English Botany,' and the short description in the Manual, both correspond better with that "dwarf violet," than they correspond with the description of *flavicornis* in 'English Flora,' or with the specimens of it in Smith's herbarium, or with any other British violet known to me. My impression, however, is, that Mr. Forster admits and recognizes the identity of his violet and that which I here call "the dwarf violet;" and that our difference begins only when he would include Smith's *flavicornis* with them also.

Lastly, as an indirect corroboration of my own views, I would allude to the circumstance of Mr. Forster and Mr. Babington differing much in their opinions regarding the Surrey violet which I deem identical with the true *flavicornis* of Smith. Mr. Forster thinks it may be referred to Smith's *V. lactea*; whereas Mr. Babington pronounces it to be his *montana*, which he gives as a variety of *V. canina*, not of *V. lactea*. So, also, Mr. Babington places "*Ruppil*" as the next variety of *canina*, differing very slightly (as he says by letter) from *montana*, and describes *V. lactea* as a different species; whereas Mr. Forster writes, "*V. Ruppil* I have always supposed identical with *V. lactea* Smith; scarcely a variety." Thus at any rate, one of these two gentlemen *must* widely misunderstand the Surrey violet; and it is my conviction that both are in error.

I have had these violets under observation for several seasons, in their wild state, transplanted into my garden, and raised afresh from seeds. Whether there are two permanently distinct species, I cannot say with any confidence; but there are two groups or series of varieties, which are distinguishable one from the other, although the several forms of the same group appear to pass into each other by almost insensible degrees. These two groups include the British violets described under the following names:—

1. *Viola canina, sylvatica, pusilla* (Forster's *flavicornis*).
2. *Viola flavicornis* (Smith), *lactea, Ruppil, montana*.

The first group is known by its broader yet more acute leaves, their

more flexible consistence, and the more purple tint of the flowers, which vary through pale lilac into white. The second group is known by its narrower and more obtuse leaves, their thicker and more rigid consistence, and the predominating blue tint of the flowers, which ranges from a deep blue through a pale blue (not lilac) gradually into white. There is, however, great variety of form and size, both in leaves and flowers. I have seen the leaves of *V. canina* quite reniform, and thus perfectly obtuse; while those of the "Surrey violet" (Babington's *montana*) are sometimes almost equally acute as in some examples of the "pusilla" form of *V. canina*. When collecting the "Surrey violet" or "dwarf violet" where they grow intermingled, I find the blue or the purple tints excellent practical guides, without which I might frequently stoop to pick the wrong plants.

H. C. WATSON.

Thames Ditton, October 24, 1847.

Note on Hieracium heterophyllum. By JAMES BACKHOUSE, Esq.

I HAVE been much interested with the description of *Hieracium heterophyllum* contained in the last number of the 'Phytologist' (Phytol. ii. 961), with which there is a species closely agreeing, on the Yorkshire side of the Tees, at Winch Bridge, above Middleton, in Teesdale, which is a district rich in this genus. From the scales of the involucre being reflexed, the absence of radical leaves, and the general habit of the plant, I have looked upon it as a form of *umbellatum*, to which it appears more closely allied than to *H. murorum* or *H. maculatum*. It may be a good species, but I should be glad if James Bladon, the author of the paper alluded to, or any other person, would point out the differences between *H. heterophyllum* and *H. umbellatum*. The latter is of pretty common occurrence in the sandy districts about this city.

JAMES BACKHOUSE.

York, 26th 10th mo., 1847.

Note on Trichomanes speciosum. By EDWARD NEWMAN.

THE curious facts handed me by Mr. Andrews, touching the longevity of the fronds of *Trichomanes*, and published in 1844, have induced me to keep a journal of a few observations of my own; and bearing in mind the dictum of Sir J. E. Smith, "that the *slightest* piece of information ought to be thankfully received," I now lay my journal before the readers of the 'Phytologist.' However, let me first of all quote Mr. Andrews' interesting remarks.

"The formation of the young frond takes place about May; the stem then gradually lengthens, without much development of the circinate character of the frond, till September, when a more rapid growth takes place; about November the full length of the stem is attained, but the pinnules are not perfectly formed, nor has the frond attained its full development until the autumn of the second year; no disposition to bear fruit is shown till the autumn of the third year, when the involucre appears, and the setæ and capsules attain maturity in October."

May 24, 1845. — Received from Mr. Moore, of Glasnevin, a small plant of *Trichomanes speciosum*, bearing five small fronds, four of them (hereafter referred to, as *a*, *b*, *d* and *e*) nearly erect, the fifth (referred to as *c*) prostrate. The two largest, *b* and *e*, appear healthy, their colour being vivid, and their ultimate divisions without any discoloration; the remaining three, *a*, *c* and *d*, were considerably smaller; apparently older than the others, and exhibiting discoloration at the extremities of their pinnæ. The frond *d*, and the stipes of the frond *b*, are beset with numerous seedling *Jungermannia* and mosses. The flower-pot containing this plant is placed in a small, glazed apartment, and a drip of water so contrived as to keep the plant constantly moist.

June 24, 1845. — The plant looks unhealthy; it is partially covered with a white deposit from the water. Removed the pot from the glazed house and placed it in a large milk-pan partially filled with broken flower-pots and earth: covered it with a common hand-glass that did not fit close.

December 24, 1845. — The white deposit has disappeared. The plant looks healthy: the smaller fronds, *a*, *c* and *d*, remain as before; the larger ones, *b* and *e*, have slightly increased in length: two incipient fronds, *f* and *g*, have appeared at opposite extremities of the rhizoma: no water has touched the fronds since the 24th June, but there is an abundance of water in the pan, and the atmosphere ap-

pears saturated with moisture: seedling ferns, mosses and Jungermanniæ growing freely.

May 1, 1846.—I discovered to my surprise that the prostrate frond *c* was unconnected with the rest of the plant: the rhizoma appeared to have rotted at the base of the frond, and a small portion, not larger than a mustard-seed, adhered to the frond. I examined the frond very carefully when removed, and could not perceive that it exhibited any alteration from its state when first examined in May, 1845, although it appeared to have been lying prostrate without roots for twelve months. I stuck it in an erect position into some earth under another hand-glass. (It is as well to finish the history of this frond at once: it remained under cover until Midsummer, 1847, when I found attached to it a rhizoma, seven-eighths of an inch in length, and bearing two very minute fronds, neither of them an inch long: it was transplanted at this date, and owing to neglect, subsequently died). The young fronds, *f* and *g*, have partially expanded, they exceed the others in length: the state of the rest remains the same: something like the circinate ball which precedes the development of a frond has appeared at another point of the rhizoma: it is densely covered with filamentous scales: the rhizoma has elongated at this point.

June 1, 1846.—The apparent ball has developed itself, and it is evidently a young frond, *h*.

July 1, 1846.—The frond, *h*, has partially unfolded itself, and is a small one.

August 1, 1846.—The fronds, *f* and *g* are completely expanded, *h* is nearly so; a young frond, *i*, has made its appearance. The others exhibit no change.

December 24, 1846.—Two new fronds, *k* and *l*, have appeared.

June 24, 1847.—The fronds, *k* and *l*, are greatly developed, particularly *k*: *h* and *i* are completely expanded. Separated the frond, *d*, with a penknife, taking with it a very small portion of rhizoma, and stuck it erect in the earth below the pot.

September 1, 1847.—After a temporary absence from home I found the interior of the glass much crowded with seedling ferns, the growth of which had been astonishingly rapid: removed the greater part of them: the young frond, *k*, exhibited discoloration at the extremities of its pinnules, as though decaying: two more fronds, *m* and *n* have appeared.

October 23, 1847.—The fronds, *m* and *n*, exhibit greatly elongated stipes: the frond *k* looks more healthy than on the 1st September, the discoloured extremities, however, remain. This frond is ten

inches in length. The frond *a* appears as when the plant was received two years and a half since, discoloured at its extremities: with these exceptions, none of the fronds, now eleven in number, exhibit any symptoms of decay. There is no appearance of fructification.

From these records, trivial as they may appear to some, the enduring nature of the fronds of *Trichomanes* is established: the peculiarity may be due in some measure to the treatment, but I believe it is mainly attributable to an innate character of the plant, which is thus truly entitled to the epithet of *evergreen*.

EDWARD NEWMAN.

October 28, 1847.

Observations on the Parasitical Nature of the Rhinanthaceæ, in reference to Mr. Mitten's paper on Thesium linophyllum (Phytol. ii. 807). By J. DECAISNE. Extracted from the 'Comptes Rendus' for July, 1847, as translated in the 'Annals and Magazine of Natural History' for September.

SINCE De Candolle established by ingenious observations and accredited by the authority of his name the separation of parasitic plants into two groups, physiologists have generally admitted it as a well-established law. It is known in fact that the phanerogamous plants which are parasitic upon the stems of other vegetables have green leaves, while those upon roots do not possess true leaves, contain no green colouring matter, but are generally of a whitish, yellowish or violet colour; in other words, they appear blanched or sickly when compared to other plants: their leaves, or the scales with which their stems are provided, are generally without epidermic pores. The absolute character of the law advanced by De Candolle has however been recently modified by the observation of Mr. W. Mitten [Phytol. ii. 807] of a plant (*Thesium linophyllum*) parasitic upon roots and nevertheless provided with green leaves.

The observation of Mr. Mitten immediately called to mind a fact I had long noticed, that is, the impossibility of cultivating plants belonging to the group of the true *Rhinanthaceæ*. Wishing to introduce into cultivation the purple cow-wheat (*Melampyrum arvense*), I frequently sowed the seed, which however all perished a few days after their germination without my being able to account for this want of success. The same applies to species of *Pedicularis* and *Euphrasia*: removed with care from the field and transferred with every possible

caution into our gardens these plants soon dry up, in a few hours they become black and so brittle that they appear to have been scorched. Bearing in mind these facts, the question suggested itself, whether the uncultivable *Rhinanthaceæ* might not be parasitic plants; in fact, their rapid death in our gardens and their injurious effects upon the neighbouring plants, a fact well known to cultivators, led me to suspect their parasitic nature. The observation which I have the honour to bring before the Academy settles this question. The species of *Alectorolophus*, *Melampyrum* and *Odontites* are true parasitic plants which fix themselves to the roots of grasses, shrubs, or even trees, by numerous suckers. These suckers are arranged on the branched and delicate rootlets of *Melampyrum* in the same manner as on the filaments of *Cuscuta*; the parasitic rootlets are in close contact with the young roots of the plants upon which they feed; the point of contact is indicated by a swelling.

I regret that I have not yet been able to verify the parasitic nature upon other species than those which occur in our fields. I propose however to examine whether what I have observed in the plants of this neighbourhood will occur or not in analogous plants, or whether this phenomenon is so modified in them as to afford an explanation of the anomalies of structure I am about to point out.

In a memoir* presented to the Academy, M. Duchartre described in a parasitic plant, *Lathræa clandestina*, a peculiar ligneous structure, the most prominent character of which is the absence of medullary rays: on the other hand, M. Elie Brongniart in noticing this fact in his report on this paper wished to ascertain whether it did not occur in other plants belonging to the same class as *L. clandestina*, and he found it in *Melampyrum*: nevertheless in pointing out the anomalous structure in these vegetables, MM. Brongniart and Duchartre did not connect it with the fact of parasitism, but merely saw in it a relation of family. However, this peculiar organization appears to me intimately connected with the parasitic nature of the plants, judging from the uniformity of structure and the black colour of the stems of *Pedicularis*, *Castilleja*, *Cymbaria*, *Bartsia*, *Buchnera*, which are all destitute, according to my observations, of medullary rays.

If parasitic plants assume a black tint mixed with blue on drying—if the absence of medullary rays is one of their attributes—and if these characters are connected with a special absorption of the nutritive juices, I may observe that these occur without exception in a

* A translation of this memoir appeared in the 'Annals' for June, 1845.

group of plants which no one has hitherto suspected of being parasites, I mean the sundews, which are likewise uncultivable. But with regard to the species of *Drosera* there is another anomaly far more singular to be investigated, that of a dicotyledonous plant being parasitical upon a moss, if, as I suspect, the *Sphagnum* is necessary to the nutrition of the *Drosera*. There still remains to ascertain the relation of causality between these characters of structure and parasitism.

With respect to the peculiar coloration of the blackening juices which these parasitical vegetables contain, that is a question which belongs to chemistry. In conclusion, the foregoing observations upon *Melampyrum*, *Odontites* and *Alectorolophus* explain clearly why it is impossible to cultivate these plants, which do not meet in the artificial soil of our gardens with the roots of those vegetables at whose expense they live; it also throws some light in my opinion upon the fact observed by agriculturists, that the *Rhinanthaceæ* exert an injurious effect upon the grasses and *Cereal*ia.

Notice of 'An Experimental Inquiry into the cause of the Ascent and Descent of the Sap, with some observations upon the Nutrition of Plants; and the cause of Endosmose and Exosmose.
By G. RAINEY, M.R.C.S.E., Demonstrator of Anatomy, and of Microscopic Anatomy, St. Thomas's Hospital. London: Pamplin, 1847.'

OUR own observations on this little work will be very brief, and we shall express no opinion as to the value of the theory which Mr. Rainey has broached. The subject is yet in its infancy. Notwithstanding the received and poetic version of the theory of sap, notwithstanding the more precise labours of our microscopists, the reflecting mind cannot but be struck with the paucity of observations and with the poverty of conclusions on a subject which in real interest almost rivals the circulation of the blood. But in inverse ratio to the brevity of our remarks will be the length of our quotations: we wish to place in lucid order before our readers the whole of Mr. Rainey's remarks, claiming for these remarks a patient and attentive investigation, but by no means asserting that we have followed the author through his elaborate researches, or have checked his facts and found his reasoning conclusive. We often observe the man of straw occupying the critic's rostrum and dispensing praise or blame as caprice may

dictate but the 'Phytologist' has a reputation to support, and cannot afford to criticise at random. It often, we may say generally, happens that the reviewer in these pages knows tenfold more of the subject than the author he reviews: in the present it is not so, and we will not assume a knowledge we do not possess. The editorial observations will therefore only serve to connect quotations, which we hope will induce our readers to possess themselves of the volume whence they are extracted.

Mr. Rainey begins thus.

"1. The fluid which vegetables imbibe from the soil on which they grow is generally called the *ascending* or *crude* sap.

"2. The crude sap, after having been elaborated in the vessels of a plant, and fitted for the development and production of new parts, is called the *elaborated* sap.

"3. The direction taken by the crude sap is always from the root towards the branches, whilst that of the elaborated sap may be either upwards or downwards, according as the process of elaboration is most active in the vessels of the roots, or in those of the leaves.

"4. Besides the movement of these fluids, there is a distinct and separate motion of that within the cells, denominated 'Cyclosis,' in which case the contents of one cell move independently of those in the adjoining cells: this phenomenon, being a local and not a general operation, does not come under the consideration of the ascent and descent of the sap.

"5. Before a precise explanation can be given, or a correct notion obtained, of the cause of the ascent of the crude sap, or of the ascent and descent of the elaborated fluid, the structures which each of these fluids traverses in its passage from one extremity of a plant to another, must be accurately determined and clearly demonstrated.

"6. The following experiments have been instituted and performed for the purpose of satisfactorily determining these points, of showing first, that the crude sap ascends along a tissue which chiefly exists *between* the cells, but which enters also into the structure of the more solid and permanent parts of a plant, and secondly, that the elaborated fluid, both in its descent and ascent, passes along the ducts and spiral vessels.

"*Experiment to show the structure occupied by the crude sap in its ascent and diffusion through all parts of a plant.*—7. The inferior extremity of a long branch of the *Valeriana rubra* was placed in an aqueous solution of bichloride of mercury, a short time after it had been removed from the plant, and its leaves had slightly shrunk

from the evaporation of their water; and it was found that, in the course of a few hours, it had absorbed a considerable quantity of the solution, and its leaves had recovered their former freshness and state of distension. Next day, this branch absorbed less of the solution than on the preceding one, and the poisonous effects of the bichloride were now visible some way up the stem, also the lower leaves were partially attacked, having become discoloured and shrunken, but the unaffected parts of these leaves and of the other portions of the branch retained their natural freshness, and appeared quite healthy. Thus the bichloride of mercury continued to destroy successive portions of the branch from day to day; those parts of it to which the influence of the poison had not extended always remaining to all appearance sound, and in some cases distinguishable from the affected ones by a line of demarcation more or less defined.

"8. After the solution had ascended into that part of the stem which was soft and contained but little ligneous matter, its diameter became very much contracted, from the collapsed state of its vessels and cells, and was rendered so flexible as to be incapable of supporting the sound parts above it, which, notwithstanding this altered and contracted state of the inferior portion of the branch, seemed perfectly healthy, and continued to receive an abundant supply of fluid. The upper parts of this branch remained vegetating in the solution during a fortnight, although the lower ones were completely deprived of every trace of vitality, shewing that the passage of the fluid along the latter into the former is wholly independent of any vital contraction of the sap vessels, as was formerly supposed by the older physiologists.

"9. But in order to remove any doubt as to the correctness of this conclusion, a stem of Valerian was obtained, from which grew two long parallel branches of equal size, and a portion, fifteen inches in length, of one of them, was exposed to the action of boiling water during a quarter of an hour, after which the inferior extremity of the parent stem was placed in a weak solution of the bichloride of mercury for a fortnight. During this time the process of vegetation was found to be quite as active in the upper part of the branch which had been acted upon by the boiling water, as in that which had been carefully protected from the action of the heat."—*p.* 2.

On repeating the first of these experiments Mr. Rainey found that in some plants the process of vegetation ceased immediately on separating them from their stems; others vegetate only at one period of the year: he also found that in cases when a plant ceased to vegetate in the bichloride it also ceased to vegetate in water: when a plant will

not vegetate either in the bichloride or in water its leaves wither from the evaporation of their moisture, the plant not possessing the power to absorb more fluid, thus showing that mere evaporation is insufficient to cause the ascent of sap. When plants retain their vitality in the bichloride the quantity absorbed is in proportion to the vigour of the leaves, proving the ascent of sap to be dependent on some vital operation. No bichloride can be found in the portion of any branch situated above the junction of the dead and living portions, which both stems and leaves below this contain abundance, so that as the water which supplied the living part "was derived from the solution, a process of decomposition of the bichloride must have been continually going on at the union of the dead with the living part of the branch all the time it was vegetating in the solution, by which the bichloride is converted into pro-chloride and chlorine, the former, being insoluble, remains in the vegetable tissue, whilst the latter, being set free, is indicated by the change which it produces in the colour of the plant; the water of this portion of the solution being thus freed of all its bichloride, ascends into the living parts of the branch to nourish them, and in this manner they receive their supply of water from this poisonous solution the same as if the extremity of the branch had been kept in water, or the entire plant had been deriving it from the soil on which it grew: so that a plant, whilst vegetating in a solution of the bichloride of mercury, may be distinguished into three parts, the living, the dying, and the part completely dead; the first contains the water of the solution deprived of all its bichloride, the second the portion of solution in which the bichloride is in the act of being decomposed, and the third the solution unchanged."

"13. Now, as in the plants thus treated, the water of the solution, which had been taken up into and nourished the living part of each branch, was in *reality* its crude sap; and as the same passages which conveyed this water, now deprived of its bichloride, must have contained the solution whilst this substance was undergoing decomposition, and therefore whilst it contained some of the bichloride unchanged; to determine the *part* along which the crude sap ascends, we have only to ascertain the precise situation of the bichloride of mercury and the tissue in which it is lodged."—*p.* 5.

The author next explains an experiment in which the bichloride has been converted into an insoluble bisulphuret by a reference to plates which we cannot transfer to our pages; and concludes this branch of the inquiry by some remarks on the quantity of intercellular tissue contained in different parts of the same plant, and on the

impossibility of discovering the pores of this tissue by means of the microscope.

*"The cause of the ascent of the Crude Sap.—*20. Having now shown that the crude sap ascends in a porous tissue, universally diffused through all parts of a plant, and occupying in greater or less abundance the intervals between the cells, there will be but little difficulty in comprehending the mode of its ascent and general diffusion. If it be admitted that the crude sap is of less density than the fluid contained within the cells, and, as the former is derived directly from the earth, whilst the latter is mixed with various soluble substances elaborated within the cells, doubtless must be so, it will then be apparent that the position of the crude sap, in a tissue situated all around the cells, is the best possible one for favouring its passage by endosmose through their walls into their interior, and for causing the intercellular tissue in the immediate vicinity of these cells thus to be exhausted of its fluid.

"21. The intercellular tissue being porous and generally continuous, must of necessity, if deprived of its fluid in any one part, attract, in consequence of its capillarity, that which is contained in the tissue of the surrounding parts, and thereby cause the crude sap to move successively from one situation to another in a direction dependent upon the position of that portion of the intercellular tissue which is being most rapidly exhausted; so that when the tissue situated between the cells in the leaves is rapidly being deprived of its crude sap in consequence of the passage of this fluid by endosmose from the exterior to the interior of the cells, this portion of tissue will attract the water from that situated around the cells in the petioles of these leaves, which, becoming more or less exhausted, will attract in like manner the water from the intercellular tissue of the stem, and thus the crude sap will be drawn up successively from one part of the stem to another, until the intercellular tissue in the root, becoming deprived of a part of its water, will re-fill itself by attracting the water from the earth through the POROUS cuticle which covers the radicles: or, if it be a branch vegetating with its extremity placed in a solution of the bichloride of mercury, as in the experiment first related, the intercellular tissue at its cut extremity will attract the solution from the vessel in which it is placed."—*p. 9.*

Besides its office of subserving the ascent of the sap, the intercellular tissue is the means of its lateral diffusion. The cells of the medullary rays are longest in their horizontal diameter, and are surrounded by intercellular tissue.

"Undue distention of the cells is prevented by the constant evaporation which takes place from the leaves, and a larger quantity of fluid is by this means caused to pass through a plant to furnish it with a sufficient supply of those substances which it requires to obtain from the soil. This process, being thus accessory to the function of nutrition, is aided by the stomata, and also by the abundant pubescence present on most leaves, and especially on young leaf-buds. Although this evaporation, called sometimes transpiration, must aid indirectly the ascent of the sap, yet of itself it is altogether insufficient to cause it to ascend; the sap ceasing to ascend as soon as the cells lose their power of elaborating their contents, and thereby keeping up the physical conditions necessary for the continuance of endosmose."—*p.* 10.

The author here records experiments tried on portions of *Anthriscus vulgaris* and *Lapsana communis*, some of which were placed in solutions of gum arabic of different degrees of strength, and others in water: the results obtained were, in the stronger solution the plants ceased to absorb several days sooner than in the weaker, and in this several days sooner than in pure water.

"25. A solution of sugar acts differently to that of gum. If transparent vegetables, when placed in a solution of sugar, be examined by the microscope, the effect is seen to be very remarkable. No plant which I have seen exhibits this effect better than the *Nitella*. Almost the instant a piece of this plant in which the cyclosis is active is brought into contact with the solution, its internal membrane becomes partially and suddenly torn from the enclosing cell-wall, its contents escape, and the cyclosis ceases.

"26. The experiments first described show that the ascending sap is attracted and not propelled; and therefore the explanation of the cause of the ascent of the sap given by Dutrochet, as the consequence of the passage of fluid from the earth into the roots by endosmose, must, in these instances, fail. Nor is the explanation advanced by some physiologists, by whom it is supposed that the crude sap ascends from cell to cell by endosmose, assuming that the contents of the cell above are always more dense than those of the cell below, less at variance with the facts shown by these experiments. As in the stems whose vitality had been destroyed by the bichloride of mercury, along which the sap, or rather the fluid which furnishes the sap, has been shown to ascend with perfect facility, there could not possibly exist that difference in the density of the contents of the cells at different parts of the stem necessary to ensure the continued

passage of the fluid of one cell into another by endosmose during a period of a fortnight or three weeks. For this imaginary state of progressive inspissation of the contents of the cells, according to their relative distance from the roots, could only be the result of a vital process; and therefore, if the ascent of the sap depended upon it, that ascent must immediately cease in any part of a stem as soon as its vitality is destroyed.

" 27. The preceding explanation of the cause of the ascent of the sap being made to depend upon the foliaceous organs, pre-supposes that they exist before the sap can begin to ascend. This, without doubt, is true, although in some cases it may seem not to be so, as these organs appear, at some seasons, from their minuteness and imperfect state of development, to be entirely absent; yet, notwithstanding, their existence is unquestionable and their function similar to that of the matured leaves. These parts, before they acquire the general characters of leaves, are more or less concealed and denominated leaf-buds; their form is conical. They consist of a central axis composed of cells and a few vessels continuous with those around the pith of the branch on which they are situated, and surrounded by rudimentary leaves. The cells resemble those of the pith in having very thin cell-walls and but little intercellular tissue, and in the external cells generally containing starch granules or some other solid matter. Now, as these germinating bodies (the leaf-buds) require a supply of water the instant their germination commences, and the solid material within their cells becomes elaborated and a solution formed, that is, the instant the conditions required for endosmose are set up, it is necessary that they should be situated near to a reservoir of that fluid: this is effected by their connexion with, and their proximity to, the pith; so that the office of the pith is most probably to contain between and within its cells that portion of water which the leaf-buds require the moment their transformation into leaves commences, and before their development is sufficiently advanced to enable them, by the absorbing power of their own intercellular tissue, to absorb it from the surrounding tissue, in the manner described when treating of the ascent of the sap into the matured leaves. Hence the reason why the pith is so universally connected with leaf-buds, and why it occupies the central portion of the ascending axis and those parts derived from it, and is absent in the roots."—*p.* 12.

The author, considering he has proved the ascent of crude sap in a tissue surrounding the cells as well as entering the structure of

their walls, next proceeds to explain the descent and ascent of elaborated sap.

“Experiments performed upon Living Plants, with a view to determine the Passages which convey the Elaborated Sap.—29. In the winter of 1844, three suckers of lilac, of two years' growth, all springing from the same root, were severally girt with a piece of copper wire, drawn as tight as it would admit of without cutting into the bark, and the effect was carefully watched until the spring of 1847.

“30. In the spring of 1845 it was observed that the budding commenced at the same time in these suckers as in some others growing from the same root; and that during the summer and early part of the autumn no difference could be distinguished in the state of the vegetation of these shoots, the girt always appearing as healthy as the ungirt ones. In the winter, one of the girt suckers was cut for the purpose of examination; the other two were allowed to remain. The part of this sucker above the ligature had received a layer of new wood of the ordinary thickness, also an addition to the bark: that included in it retained of course its former diameter, but had undergone an alteration, a thin layer of wood having been added to that of last year, and the bark having become thinner than it was before, in consequence of being compressed between the new wood and the ligature. The part below the ligature was smaller than that above, and had received a new layer both of wood and of bark, but both *much thinner* than those above the ligature. In the immediate vicinity of the wire the shoot was swollen both above and below, but more so above than below.

“31. In the spring of 1846, the two constricted suckers which remained were observed to begin budding at the same time as some other suckers growing from the same root; and during the spring and summer no very material difference could be distinguished in their states of vegetation. The leaves of the constricted suckers appearing perhaps a little yellower than those of the unconstricted ones, but in all other respects they had the same aspect. The part of the stem close to the ligature was swollen both above and below it; and although the stem above the wire had increased considerably in diameter, the part below it had undergone no increase in thickness.

“In the early part of the summer, one of these suckers was cut and examined with the microscope, but the other was allowed to remain for future observation. The part of this sucker above the ligature had received a layer of new wood, also an addition to its bark: that included in it had undergone a change similar to the one mentioned in

the last experiment; but the part below the ligature had undergone no change whatever: not the slightest addition had been made either to the wood or to the bark.

"32. The sucker which was left, the only remaining one, still continued to grow, increasing in size above the ligature, but not in the least below it. Its leaves were as large, and with the exception of a slight yellowish tint, appeared as healthy, and remained as long attached to the plant as those of the suckers which sprang from the same root, but had not been experimented upon.

"33. In the spring of the next year (1847), at the period when all the leaf-buds of the unconstricted suckers began to swell and develop themselves, those of the constricted one rapidly withered. Up to this time they were as large, and appeared as healthy, as those of the other suckers.

"At the commencement of June (1847) this sucker was cut and examined. The part of the stem above the ligature had received a layer of wood, and an addition of bark to that of the preceding year. The part included in the ligature it was not considered necessary to examine. The part below the ligature had received no addition whatever to the wood of the last year, and the whole thickness of the stem had lost its natural aspect, appearing brown and destitute of vitality, whilst the part above the ligature was of a greenish colour, and had a healthy appearance."—*p.* 15.

From these experiments the author concludes, as the ligature allows the ascent of the crude sap without permitting the elaborated sap to pass below it,—the formation of wood and bark going on above after it has ceased below the ligature—that the ascending and descending fluids pass by different channels, and that the elaborated sap does not descend along the intercellular tissue; and farther, that when the new wood does not extend below the ligature and does not communicate with the root, vegetation ceases in the entire shoot, first below, then above the ligature; proving the layers of wood to be independent of each other, and also proving the necessity for each layer's having a separate connexion with the roots. Seeing the descending sap does not pass along the intercellular tissue, and seeing, moreover, that the cells do not communicate with each other, the descent of elaborated sap must take place through the vessels, which are continuous passages extending from the leaves to the roots, and having large and well-defined openings of communication with each other, the anatomical requirements of tubes for the transmission of fluids. The paragraphs which follow those whence the foregoing

summary is drawn, are penned to show the best treatment of leaves or petals prior to a microscopical examination: the author then proceeds —

“39. The vascular bundles of a leaf are continued into its petiole, and from thence they pass into the stem, where they become dispersed, some are continuous with the spiral vessels situated around the pith, and others with the vessels of the layer of wood last formed. These vessels, in their passage through the bark, are contained in large canals, situated between the liber and the cuticle, in which they appear to lie naked. Some of the vessels in the petiole do not pass directly into the stem, but either become intermixed with a quantity of loosely connected cells, or anastomose with the vessels of the adjacent bundles; these can be very well seen in the fig-tree, by making a vertical section through the petiole at its insertion into the stem. The canals which transmit the vessels appear to be continuous with spaces of various sizes, continued all along the bark of the stem, and situated at different distances from the surface. Their walls or immediate boundaries consist of rows of cells piled one row upon another; sometimes they are smooth and at others they are covered with small whitish granules. Many of the passages seem to become filled up more or less completely with clusters of new cells, which have a pale greyish tint, and resemble *wood cells* in their form and general characters; they are also acted upon in a manner similar to such cells by the tincture of iodine. In order to trace distinctly the passage of the vessels of the petiole into those of the wood, thin, vertical and horizontal sections must be made through the attachment of the petiole with the stem, and afterwards treated with acetic acid in the manner described. As the vessels descend from the attachment of the petiole into the wood, they lose somewhat the character of true spirals, and become more like barred ducts. Probably a difference in the mechanical conditions under which vessels are placed in the leaves and in the stem, renders it necessary that the former should be more perfect spirals than the latter.

“40. The manner in which vessels are formed from cells can be very well seen by examining plants during their growth, and contrasting the same structures at different periods of their development. The petals of the potato, taken a little before the flowers have expanded, and previously rendered transparent by the employment of acetic acid, show well the manner in which vessels increase in length. In the colourless parts of these petals, bundles of long but very narrow cells may be observed marking out the place for the future vessels; and, at

the part where these cells are continuous with the vessels, extremely minute dark points are visible in the walls of the former. These points coalescing, form a number of lines, indicating the spaces between the coils of the spiral fibre in the perfect vessel. After several of these cells have been thus transformed into vessels, a new joint is formed, which at first lies merely in contact with the extremity of a previously finished joint, but afterwards communicates with it in the manner before described, and thus a vessel is increased in length by the successive addition of new joints. At first, the marking of many of the recently formed vessels is so faint as not to be distinguishable, excepting by the best lenses of a high magnifying power, but it gradually increases in distinctness as the spiral fibre becomes developed."

The author then explains, by means of a reference to his plates, that the larger vessels acquire their diameter by the union of cells, the diameter of the vessel depending on the number of cells united: he remarks that "the spiral fibre can be observed to become developed in the walls of the cells;" this does not appear very obvious even with the assistance of plates, and without that assistance we doubt our ability to make it manifest to our readers. The fibre commences in a minute oval spot in the centre of which a "thinning" makes its appearance and increases continually in a transverse direction to the axis of the vessel, until it joins other similar spots, forming a transverse bar; a series of such bars frequently occupies the breadth of a single cell without extending at all to the collateral cells: when these lines or transversely extended spots become continuous with those of the collateral cells and form several circles round the vessels, a spiral fibre is the result; and the vessel is called a "spiral" vessel; but when the appearance is bar-like the vessel is called "reticulated." The author concludes that as vessels are made up of cells; as the same structure is common to vessels and cells; and as vessels contain a fluid and in many cases a solid material; it is therefore probable that the functions of cells and vessels are analogous, and that vessels receive their fluids by endosmose from adjacent intercellular tissue and perhaps from surrounding cells.

"45. Now, each cell being isolated, and without any communication with those in its vicinity, the pressure exerted upon the inner surface of its walls, in consequence of the passage of a larger quantity of fluid into it by endosmose, than can escape from it in the same time by exosmose (to which pressure the enlargement of the cells is due), is altogether local and limited; and thus the development of one part of the cellular system of a plant is independent of that of another

part. Vessels on the contrary, being a species of cell, designed to elaborate materials, like as do the ordinary cells, but, for the production of remote parts, and afterwards being intended to convey their elaborated contents to the place of destination, require that free communications should exist between them, in order that the fluid elaborated and accumulated more particularly in one part of the vascular system, may, by the force of distension, be propelled into all the other parts communicating with it. Hence, when the process of elaboration is most active in the vessels of the leaves, and a quantity of fluid, proportionate to the activity of this process (*i. e.* to the quantity of soluble matter which is being formed) is, by endosmose, passing into them from the adjacent intercellular tissue, this fluid cannot fail to be forced into those vessels which are receiving less fluid from the surrounding parts; for instance, into those of the petioles of the leaves, and from these vessels some of the elaborated sap must pass into the vessels around the pith to furnish the material necessary for the production of starch, or other nutrient matter for the leaf-buds of the ensuing year, but the greater quantity will pass into the ducts of the wood (these being continuous with the vessels descending from the petioles), for the production of new wood and new bark. It is possible that some part of the contents of the vessels, during their passage through the cellular spaces in the bark, may escape, and that to this is due the granular matter, or the clusters of cambium cells found in these spaces. But the most probable cause of the passage of the elaborated sap from the vessels and ducts must be looked for in the endosmic action of the surrounding cells. These cells in vegetables performing probably a function similar to that which epithelial cells perform in animal structures, especially in those structures which are but sparingly supplied with blood, such for instance as cartilage. In animals a thin membrane called *basement*, or *limitary* membrane, is generally situated between the vessels containing the nutrient fluid,—the blood-vessels,—and the epithelial cells, to which physiologists ascribe more or less of importance. In vegetables no such membrane is present; but in the ligneous parts of a plant the walls of the ducts are provided with minute nucleated cellules generally of an hexagonal figure, and disposed in the form of a tessellated epithelium. Where the vessels of the petiole become continuous with these ducts, the spiral fibre gets more and more imperfect in proportion as this disposition of cellules makes its appearance: hence, as the vessels of wood must be confessed to have a more active function, in reference to the production of new parts, than those of the petiole of leaves (the

office of these being only to convey the fluid elaborated in the leaves to the ducts of the wood), this apparatus of cellules may be inferred to perform some function connected with the especial organization of new wood and bark, as yet unknown.

“46. Perhaps the spiral fibre of the vessels of leaves, besides tending to prevent the dissipation of their fluid by evaporation—and thus keeping up a greater degree of distension than would be required in the ordinary cells,—may confer also upon these vessels a resiliency and elasticity advantageous in regulating the pressure upon their contents, and the passage of the fluid along them.

“47. That the vessels of the leaves do elaborate a fluid, and conduct it from thence into the branches, stem, and roots, for the production of new wood and new bark, is proved by the fact of these structures completely ceasing to be formed, where the descent of the elaborated fluid is prevented by ligature, whilst they are produced in the ordinary quantity in the stem above the constriction; for, if the intercellular tissue, or the ordinary cells, and not the vessels, had been the elaboratories and conductors of the descending sap, these two structures, the intercellular tissue, and the cells situated above the ligature being so much, and so closely connected with the same structures below it, would still have allowed of the descent of a portion of the elaborated sap, as one of them, the intercellular tissue, allows the free ascent of the crude sap, and the growth of the stem would not have been so completely arrested below the wire whilst it was going on uninterruptedly above it. The layer of wood and bark of the sucker, which had been cut at the end of the first year, being much thinner below than above the ligature, was the consequence of the constriction of the newly formed vessels at the girt part, by the pressure of the gradually increasing layer of new wood on one side, and the wire on the other. And the circumstance of there being, in the other sucker, no addition whatever made to the wood and bark below the ligature during the second year of its application, proceeded from the entire closure of these vessels by the continued increase of this pressure, so that now no sap could descend below the constricted part. And the fact observable in the same sucker, of the sap elaborated in the leaves of 1846 not being permitted to descend below the ligature applied in 1844, proves that there are no collateral or anastomosing channels between the layers of wood of *separate years*, capable of conducting the descending sap, although there is no interruption whatever to the passage and lateral diffusion of the ascending sap. It shows also that the descent and the ascent of the sap must

take place through a very different system of parts, the descent of the elaborated sap being limited to one direction and confined only to one part of a plant, whilst the crude sap, in addition to its passage upwards, is diffused throughout its entire substance. Now, there is no other system of organs in plants, excepting vessels, which are capable of thus limiting the passage of the elaborated sap; nor is there any one but the intercellular tissue (that is, the tissue filling up the intervals between the cavities of the cells) which can allow the crude sap to have such an universal diffusion.

“48. Now, as long as the process of elaboration is going on most actively in the leaves and other foliaceous organs, and the material elaborated is disposed of in the parts which are situated below them, that is, nearer the roots, the direction taken by the elaborated sap along the vessels must be downwards, and thus it ought to continue until these organs have accomplished all the purposes for which they were intended, until, after having completed their own development, they have provided for the propagation of the species by the production of seed. In this case the process of elaboration is first employed in forming cells, and afterwards in depositing within them solid matter for the nutrition of the germs at some future period. As the process of deposition advances, the conditions become less and less favourable for endosmose, and after the cells have become full, these conditions cease to exist, and no more fluid is attracted into the intercellular tissue surrounding them: that which they did contain evaporates, and the seed, as well as those parts whose function had been subservient to its growth and maturation, become so altered in their physical characters as to unfit them for being retained any longer on the plant, until also a provision has been made for the leaf-buds of the ensuing year, by a deposition of starch or some similar substance in the vessels and cells of the stems and roots. Hence, if the root of a vine be dug up in the winter, the cells and vessels situated in the outer layer of wood are found filled with starch granules; if in the spring, after it has ceased bleeding, as it is termed, and the leaves have appeared, the quantity of starch in these vessels and cells will have very much diminished, and at a still later period it will be found almost to have disappeared; and lastly, until a deposit has been formed of finely granular matter around the last year's wood. This deposit is contained in minute square cells, compressed in the direction of a line extending from the centre to the circumference of the stem, and forming collectively a dark-coloured ring all around the last year's layer of wood, by which a thin transverse section made in

the winter can be distinguished by the microscope from one cut at any other period. This deposit being formed in the autumn, may be called the *autumnal* deposit. This is one of the earliest parts in which, at the commencement of spring, a process of elaboration is seen to begin: as this process is going on, the granular matter disappears, and the cells become of an irregular figure and filled with fluid: still later these cells become broken up, and their place occupied by vessels and ligneous cells. The distension of these cells with fluid, and their consequent breaking up, is the cause of that loose connexion between the wood and the bark, so remarkable in the branches of most trees at the spring of the year. The foliaceous organs having made these provisions for the future, and fulfilled all the purposes for which they were designed, now become useless; and the process of elaboration ceasing in their cells and vessels, they attract no more crude sap, become withered, and unfit to be retained on the tree, and are therefore shed; and the plant experiences a state of repose, the duration and completeness of which varies in different kinds of plants."—p. 27.

Mr. Rainey then proceeds to explain the ascent of elaborated sap. It having been ascertained that starch is deposited in the roots while the leaves are in active operation, and that this starch is undoubtedly designed for the supply of leaf-buds; it becomes necessary *first*, that the starch or its elements be so changed in physical properties as to be capable of being conducted to the part requiring it to be nourished; and *secondly*, that they be so propelled as to reach such parts. The author's idea is that the starch is dissolved in the water imbibed from the earth by capillary attraction, and that this supply continues to press upwards the fluid already in the vessels of the stem, branches, and finally of the developing leaf-buds. This seems to require further explanation: the ascent of fluid in a previously empty capillary tube is supposed to be caused by its very emptiness; load a sponge with water and capillary attraction ceases: squeeze out the water and it recommences immediately: on the same principle is it not requisite that the sap already in the branches and buds should escape before capillary attraction can act so powerfully at the root as to drive all upwards in the way described? We merely suggest this for the author's consideration: we do not venture to ground an objection to his views on this seemingly insufficient explanation. The author himself is aware that the plant with unexpanded leaves has no means of getting rid of the superfluous water, and he says that in consequence the vessels become distended. When an incision is made in the bark (especially of the

vine) in the spring of the year, the flow of fluid is most copious, and this may not only prove that the vessels are unusually loaded with fluid at that season, but by emptying the vessels may set up a capillary attraction from the roots upwards.

The remaining chapters of this little brochure are entitled, "*Nutrition of Plants*" and "*On the cause of Endosmose and Exosmose*:" they will abundantly repay an attentive perusal, and we have already extracted so largely that our article has far exceeded the space we can conveniently afford it in the concluding number of the year. The low price at which the essay is published places it within the reach of every one who feels an interest in the subject, and we therefore recommend our readers to procure it for themselves.

In conclusion, we cannot refrain from animadverting on the excessive badness of the punctuation, which perpetually renders the author's meaning doubtful, and sometimes destroys it altogether: in our extracts we have taken the liberty of altering this in more than a hundred instances, substituting commas for colons, semicolons for full points, and striking out commas: in doing this we hope we have always retained the author's meaning. We recommend Mr. Rainey on future occasions to trust this matter to his printer: no compositor, even though a boy, in the first year of his apprenticeship, could exhibit such ignorance of the principles of punctuation.

K.

Note on Centaurea Jacea, Linn. By EDWIN LEES, Esq., F.L.S.

SINCE writing my observations on the radiant-flowered variety of *C. nigra* I have been favoured with a specimen of the true *C. Jacea*, from Altona, in Denmark, kindly sent me by my worthy friend, the Rev. Andrew Bloxam, incumbent of Twycross, Leicestershire, so well known to British botanists by his acute observations of species, and observations of new plants, as well as by his useful *Fasciculus* of the British Rubi. This specimen, I am happy to say, shows at once the complete distinctness of *C. Jacea* from *C. nigra*, and confirms the accuracy of Sir J. E. Smith in his statement that the calyx of the latter is "essentially different" from the former. None of the involucreal scales have the black, ciliated appendage so conspicuous and characteristic in *C. nigra*, but their summits are scariose, of a deep chestnut brown, at once justifying the appellation of "Brown-radiant knapweed." The outer scales are scarcely more than *fringed* at the upper

margin, succeeded by others irregularly *torn*, while the innermost terminate in an orbicular, deeply-divided lobe, jagged in a very irregular manner. Thus the difference of structure as well as colour of the involucreal scales is seen at a glance, when the two plants are compared together. This, then, is the point to attend to, and not merely the radiant flowers. The latter are obvious enough in *Jacea*, though in my specimen by no means so large as in the radiant variety of *C. nigra*.

Radical leaves are wanting in my specimen from Denmark, the upper ones are narrower, sharper pointed, and much less rough than in *C. nigra*, in fact almost smooth, linear-lanceolate, sessile, with a single tooth near the base. I can say nothing with regard to the seed-down.

I have never met with British specimens of *C. Jacea*, and Sussex is the only county where the true plant appears to have been gathered by Mr. Borrer. If, however, collectors will attend to the involucreal scales rather than the radiant flowers, they may probably be rewarded by finding it elsewhere.

EDWIN LEEs.

Henwick, Worcester,
November 14, 1847.

BOTANICAL SOCIETY OF LONDON.

Friday, 5th November. — J. E. Gray, Esq., F.R.S., &c., President, in the chair.

Donations of British plants were announced from Mr. Hewett Watson, the Rev. A. Bloxam, Dr. Lemann, the Rev. W. R. Crotch, Mr. J. W. Salter, Mr. A. J. Hambrough, Mr. E. G. Varenne, Mr. B. M. Watkins, Mr. James Motley, the Rev. R. C. Douglas, Mr. J. Rich, Mr. G. Cooper, Mr. F. Barham, Mr. G. Rich, Mr. H. O. Stephens, the Rev. T. Butler, Mr. B. D. Wardale, the Rev. G. W. Sandys, Mr. R. J. Mann, the Rev. H. Marsham, Mr. W. Mitten, Mr. H. Taylor, the Rev. J. Bigge, Mr. T. Moore, Mr. W. L. Notcutt, Mr. F. P. Pascoe, and Mr. G. E. Dennes.

Azorean specimens had been received from T. C. Hunt, Esq., Her Majesty's Consul at St. Michael's, and foreign specimens from Dr. Southby.

Miss Charlotte Wilkins, of Westbury, Wilts, and Mr. Amos Beardsley, of Heanor, near Derby, were elected members.

The Rev. Andrew Bloxam presented specimens of *Anacharis alsinastrum* (Bab.), discovered by Miss Kirby in ponds or reservoirs near Toxton Locks Canal, near Market Harborough, Leicestershire, in October last.—G. E. D.

Account of a few days' Ramble among the Mountains of Cumberland and Westmoreland. By JAMES BACKHOUSE, JUN., Esq.

LEAVING Carlisle by an early train on the morning of the 2nd of 8th mo. (August), we stopped at the village of Shap, and soon found ourselves upon the wild moors on our way to Hawes Water. Crossing the sequestered valley of Swindale, which is finely shut in by the mountains at the upper part, we reached the lake near its head, after descending through Naddle Forest, which skirts its eastern shore for some distance. Hawes Water produces *Lobelia Dortmanna* and *Isoetes lacustris*, in common with most of the lakes in the district: *Alchemilla alpina* grew almost down to the waters' edge, and *Saxifraga azoides* began to gild the margins of the mountain streamlets. Bending our course up the deep valley Mardale, we reached "Small Water Tarn;" on the rocks between it and Blea Water we saw *Oxyria reniformis*, *Asplenium viride* and *Hieracium Lawsoni*. From Blea Water we climbed to the top of High Street Mountain, which rises immediately above it, and continued along its ridge until we passed Hays Water, when we descended and followed a mountain path which lead us into the Kirkstone road, near Brothers Water. After a refreshing night's rest at the comfortable inn in Patterdale, we ascended Helvellyn to the Red Tarn, round which we passed, finding *Juncus triglumis*, *Eriophorum polystachion*, var. *elegans* (Bab.), and some fine specimens of the large form of *Carex rigida*. On the Striding edge we met with *Cerastium alpinum*, *Oxyria reniformis*, *Saxifraga oppositifolia*, *Hieracium diaphanum* and *Hieracium nigrescens* of Babington. From the top of Helvellyn we descended to Wythburn, where we passed the night. The streams on the western side of the mountain abound with *Epilobium alpinifolium*. The next morning our route lay by Harrop Tarn and Blea Tarn, to the edge of Borrowdale: descending opposite to Eagle Crag, we bent our steps up a deep valley, the cliffs on each side of which were fine and imposing; and the dark Bow Fell with his head bathed in cloud, formed a fine centre-piece to the picture. On the rocky summit of Glaramara we found *Hieracium alpinum* in its genuine form, with entire leaves, long silky

pubescence, and lax outer involucre scales: *Saxifraga oppositifolia*, *Carex rigida* (usual size) and a very large form of *Salix herbacea*, were also on its craggy sides. Keeping along the mountain ridge, we passed a fine ravine, meeting with scattered plants of *Hieracium alpinum* almost to its edge, but immediately after leaving it, the rocks produced *H. nigrescens*, which seems a very distinct species, and may easily be distinguished from *H. alpinum* at some distance by its black (or very dark) heads of flower: its leaves are slightly notched, and the pubescence of the whole plant is shorter and less silky, the outer involucre scales are not lax, and the yellow of the corolla is a shade darker; we saw no instance of its bearing more than a single flower on each stem, although some of the plants had from four to eight or ten stems from one root. Here we noticed again scattered plants of *Juncus triglumis* in stony, wet places. We kept on this ridge till we came to a little cluster of nameless tarns, when we gradually descended, rounding the head of Borrowdale, above a deep gorge immediately under the frowning cliff of Great End, to a solitary mountain lake called Sprinkling Tarn: the stream flowing from this lake led us to the Styehed Tarn near the top of the imposing pass between Borrowdale and Wastdale. To the latter valley we bent our course amidst clouds, wind and rain, and after a rough descent down the side of Great Gavel we reached the farm-house at Wastdale, where we were greeted by a kind friend who had come to this wild spot to join us in our ramble. The following morning the mountains were almost buried in cloud, but as we were each provided with a pocket-compass, we determined to try Scawfell Pike: cloud and mist soon enveloped us, and the violence of the wind was such that we were glad to obtain temporary shelter in a hole among the rugged rocks on the top of Lingmell; after a hard climb we reached the top of the Pike, where we rested awhile, and then carefully descended, having to face the blast. Anxious to avoid the great ravine of Mickledore, we got too far to the north, and found ourselves amongst high crags and tumbled rocks near the head of a grand ravine, down the perpendicular side of which a mountain stream bounded with unbroken fall from a great elevation. Finding ourselves completely "lost," we applied to our compasses, as little or nothing could be seen from the density of the cloud, and discovered that we were going exactly in the opposite direction from that which we intended; of course we turned directly back again, and slowly reascended the ridge above us: the stormy wind from which we had been sheltered when out of our way, again burst upon us with great violence, accompanied by heavy rain;

umbrellas became useless, one being broken to pieces, leaving only the iron rod for a walking stick: soaked to the skin we pursued our dreary way amid the cloud guided by the compass only, and before very long were glad to find ourselves on a grassy ridge similar to the one we had ascended; after a while we emerged from the cloud, and soon made our way down to our resting-place. The prospect was brighter the next morning, and gleams of sunshine enlivened our path up the rival height of Scawfell, and revealed some of the dangers of Mickledore, the precipitous and almost impassable ravine, separating this mountain from the Pike. The Scawfell pink, so much talked about in the district, is nothing but *Armeria maritima*, var. *montana*. After descending Scawfell we climbed the Screes, a range of magnificent, shaley cliffs, which skirt the south-eastern side of Wast Water, and rise 1,900 feet above the lake. In Hawl Gill, a granitic valley near the western extremity of the Screes, *Hymenophyllum Wilsoni* clothed the rocks. After refreshing ourselves in the beautiful village of "The Strands," we had a delightful row up the lake by twilight, and reached our sojourning place ready for bed. A climb up the back of Lingmell, to survey the deep chasm of Pierce Gill, and a long walk over the mountains, past Honister Crag, brought us, on the following morning, to the little inn at Buttermere, without having seen any plants of note but *Hieracium alpinum*, which grew on the rocks above Pierce Gill: after a rest we passed Crummock Lake and part of Lowes Water, reaching Low Mosser in the evening, where we spent the next day under the hospitable roof of our fellow-traveller. Resuming our journey, we passed through Cockermouth, Keswick and Penrith, to Appleby, and the next morning took a car to the village of Knock, and commenced a careful examination of Knock-ore-gill, a valley in the Crossfell ridge, belonging to the Teesdale district: in the head of the gill we found a fresh locality for *Saxifraga Hirculus*, and *Juncus triglumis* was in almost every bog. An *Epilobium* of uncommon appearance, and not agreeing with the description of any English species, grew in the same bog with the *Saxifraga*, also a *Myosotis* differing from the common form of *repens*, to which it approached the nearest. An extremely fatiguing walk, over part of an almost endless moss, conveyed us to the head of High Cup Scar, where we saw *Saxifraga nivalis* in its old locality; on the ridge between this ravine and Murton Pike, which we climbed, there was abundance of *Rubus chamæmorus* in fruit; we returned to Appleby that evening, and the next day passed through the long and deep valley of Scordale, and after four or five miles' journey through a cloud,

down the side of Maize-beck, reached Cauldron Snout Bridge: in its old locality we saw abundance of *Alsine stricta*, and on Falcon Clints a fine plant of *Woodsia Ilvensis*; we lodged at the High Force Inn that night, and then returned home.

JAMES BACKHOUSE, Jun.

York, 10th mo., 1847.

Notice of a Few Plants growing at Weston-Super-Mare.

By FENTON J. A. HORT, Esq.

THE following list of a few of the less common plants observed during a residence of a few weeks in August and September of this year at Weston-super-Mare, Somersetshire, may be found interesting.

Meconopsis Cambrica. Limestone debris at Cheddar Cliffs.

Glaucium luteum. In the inclosed part of the sandy cliff at Aucher Head; perhaps cultivated.

Diplotaxis muralis. In a stony road.

Koniga maritima. Common by road-sides in the neighbourhood of the sea.

Cochlearia officinalis. On the cliffs.

—— *Anglica*. Ditto.

Reseda fruticulosa. Waste ground mostly near the sea.

Alsine marina, β . *marginata*, Bab.

Erodium moschatum.

Ulex nanus, β . *major*, Bab.

Medicago falcata.

Trifolium arvense.

—— *fragiferum*.

Lathyrus sylvestris.

Spiræa filipendula. Common.

Oenothera biennis. On Brean Down, in waste spots near patches of potato-ground.

Circæa alpina. Limestone debris, Cheddar Cliffs.

Hydrocotyle vulgaris.

Eryngium campestre. Tolerably plentiful in the corner of a grass-field on the slope of Worlebury Hill, above Weston, about a quarter of a mile from the sea.

Apium graveolens.

Fœniculum officinale. Most abundant.

Centranthus ruber. Cliffs and walls about Aucher Head, perhaps naturalized.

Artemisia maritima, γ . *salina* (?).

Centaurea nigra, β . *radiata*, *Bab.*

Carduus acaulis.

Linaria minor.

—— *repens.* At Locking.

Scutellaria galericulata.

Nepeta cataria.

Samolus Valerandi.

Spiranthes autumnalis.

Iris foetidissima.

Phalaris Canariensis.

Ceterach officinarum. On the rocks of Worlebury Hill, and very common on almost every wall in the neighbourhood.

I have omitted three or four rare plants which are known by every botanist to exist in this neighbourhood.

F. J. A. HORT.

Trinity College, Cambridge,
November 5, 1847.

Note on Centaurea nigra, var. radiata, and C. nigrescens.

By FENTON J. A. HORT, Esq.

IN reference to the controversy now continuing respecting the *Centaurea nigra*, β . *radiata*, and the *C. nigrescens* of Babington, I may mention that in ascending one of the Cotswolds in September, from Cheltenham, by one of the beautiful grassy, bushy lanes so numerous in that locality, I was attracted by the unusual appearance of a plant: it proved a *Centaurea*, with larger, paler, and at the same time brighter flowers, and leaves and whole habit paler and more delicate than the common *C. nigra* with rays, which grows most abundantly in the neighbourhood, in fact quite as abundantly as the normal form without rays. I observed that, as in the *C. nigrescens* of Babington, "about the three innermost rows" of the involucral appendages were "separated from the rest and exposing the scales;" and I noticed the same character in some mutilated and wretched specimens which I found a few days after, again struck with the peculiar colour. The other characters appeared to agree with both descriptions equally well; but the difference in the general appearance and habit could

not be overlooked, the perfect specimens being exceedingly elegant, and having none of that dark, rigid, gaunt growth which is apparent in every well-grown plant of the common *C. nigra* with rays that I have seen. I should add that this dissimilarity is by no means so striking in the dried specimens.

I may also add that I have discovered *Polypodium calcareum* growing sparingly in a stony thicket on Windlass Hill, in the same neighbourhood: its occurrence on Cleave Hill, three or four miles distant, has been previously recorded by Mr. James Buckman, in his *Flora of the neighbourhood*, and by Mr. Edwin Lees: the specimens I found were large and densely "glandular-mealy." *P. Dryopteris* is not found in that locality.

F. J. A. HORT.

Trinity College, Cambridge,
November, 5, 1847.

Notice of Leighton's Shropshire Rubi.

WE are enabled to insert below a list of the Forms of Brambles comprised in the Fasciculus of Dried Specimens of Shropshire Rubi, just issued by the Rev. W. A. Leighton, author of 'Flora of Shropshire.' The basis of the work has been the specimens authenticated by Esenbeck, Borrer and Lindley, from which the descriptions in the 'Flora of Shropshire' were framed. To these many others have been added, which subsequent research has brought to light—and the whole are now named according to the nomenclature adopted by Mr. Babington and Dr. Bell-Salter in Babington's Synopsis. The work may be regarded as a revision of the genus *Rubus* in the 'Shropshire Flora'—and shows the present views of the author. The specimens selected are generally speaking typical forms—and are carefully and well dried. To botanists generally, the work cannot but prove interesting, and to the student of this difficult and perplexing genus, particularly useful and valuable. The impression (*technically* speaking) is necessarily limited—and we understand that above one half of the copies are already sold and distributed.

suberectus (Anders.)
fissus (Fl. Shropsh.)
plicatus. (W. & N.)
affinis (W. & N.)
nitidus (W. & N.)

corylifolius (Sm.)
cordifolius (W. & N.)
discolor (W. & N.)
—— *γ. argenteus* (Bell-Salt.)
leucostachys (Sm.) *β. vestitus* (B. S.)

sylvaticus (W. & N.)	———— <i>γ. echinatus</i> (Bab.)
Leightonianus (Bab. Syn.)	Kœhleri (W. & N.) <i>γ. pallidus</i> (Bab.)
carpinifolius (Fl. Shropsh.)	———— <i>ε. fuscus</i> (Bab.)
macrophyllus (W. & N.)	hirtus (W. & N.)
———— <i>β. Schlechtendalii.</i>	glandulosus (Bell.) <i>γ. rosaceus</i> (B. S.)
rudis (W. & N.)	Schleicheri (Fl. Shropsh.)
—— <i>β. Leightonii</i> (Bell-Salt.)	nemorosus (Hayne.) <i>δ. ferox</i> (W. & N.)
fusco-ater (W. & N.)	cæsius (Linn.)

Occurrence of Udora Canadensis, a Plant new to Britain and Europe, near Market Harborough, in Leicestershire. By EDWARD NEWMAN.

I AM indebted to Miss M. Kirby, of Leicester, who is also the original discoverer, for the information that a plant, not only new to Britain, but also to Europe, has been found growing abundantly and luxuriantly in certain reservoirs of the canal near Market Harborough, in Leicestershire. In many instances of our new discoveries, single specimens, or a few scattered plants have been esteemed sufficient to warrant the introduction of a new name into our catalogues of British plants: it has, however, very frequently turned out that the species is clearly of exotic origin, and its introduction merely accidental. In the present instance, however, the case is widely different: the plant has every appearance of being a true native, and I believe has also been found, now that attention has been turned to Miss Kirby's discovery, in three other widely separated British localities.

I learn from our best botanists that this plant is the *Udora canadensis* of Nuttall, ii. 242, the *Elodæa canadensis* of Michaux, and the *Serpicula verticillata* of Muhlenberg. It closely resembles the plant figured under the last-mentioned name in Roxburgh's Coromandel plants, although some botanists suppose it can scarcely be the same, and it is mentioned in Mr. Dennes' Report on a preceding page as *Anacharis alsinastrum* of Babington, but I know not whether this name is published, or merely given provisionally, under the impression that the plant was previously undescribed.

Not the least interesting fact connected with the discovery is the remarkable history of the physiology and economy of the plant, which is identical with that of *Valisneria*.

EDWARD NEWMAN.

Devonshire Street, Bishopsgate,
27th November, 1847.

Notice of 'The London Catalogue of British Plants.' Second Edition. Pamplin, London, 1848.

NOTWITHSTANDING its date, it seems desirable to acquaint Botanists with the fact that the second edition of this Catalogue is already published. The usefulness of this work for its immediate object has been abundantly proved. Had the Botanical Society of London continued to employ the Edinburgh Catalogue, which, notwithstanding the evident pains taken to obtain a correct nomenclature, is most confusedly printed and most clumsily planned, it must have come to a stand still instead of so greatly outstripping the Edinburgh Society as it has done notwithstanding the various superior advantages which the latter certainly enjoyed. We can scarcely suppose our readers unacquainted with the first edition of the London Catalogue, and have therefore only to notice what may be termed the *differences* between the two: these may be ranged under the four following heads:—

First. All newly-discovered species up to the autumn of 1847 have been added in their respective places.

Secondly. The list of excluded species has been greatly increased, being now nearly one hundred and fifty with dubious claims: all these have either been found occasionally or recorded as British species.

Thirdly. The list of names under *Rubus*, meaning nothing certain, has been entirely left out for reasons explained in a quotation given below.

Fourthly. The Catalogue is no longer anonymous, being avowedly the work of a commission appointed by the Botanical Society of London, and consisting of George Edgar Dennes, Esq., honorary Secretary, and Hewett Cottrell Watson, Esq., and we fancy we may ascribe to the gentleman whose name so modestly stands second in the commission the chief share in the undertaking.

In getting up Catalogues of this kind two things are to be considered: *first*, accuracy; *secondly*, intelligibility: we conceive both of these are achieved in an eminent degree in the publication before us, yet in some cases we detect a little departure from rigid accuracy, not unadvisedly, but from some motive of expediency, which the authors, had they space, would doubtless explain; for instance, take the last species in the rejected list, *Equisetum fluviatile*, a common English plant to which Linneus and all continental authors apply this name. A foreigner must suppose that the well-known *Equisetum fluviatile*, so common on the Continent, has been recorded as an inhabitant of Britain, but that Messrs. Dennes and Watson having found that record

